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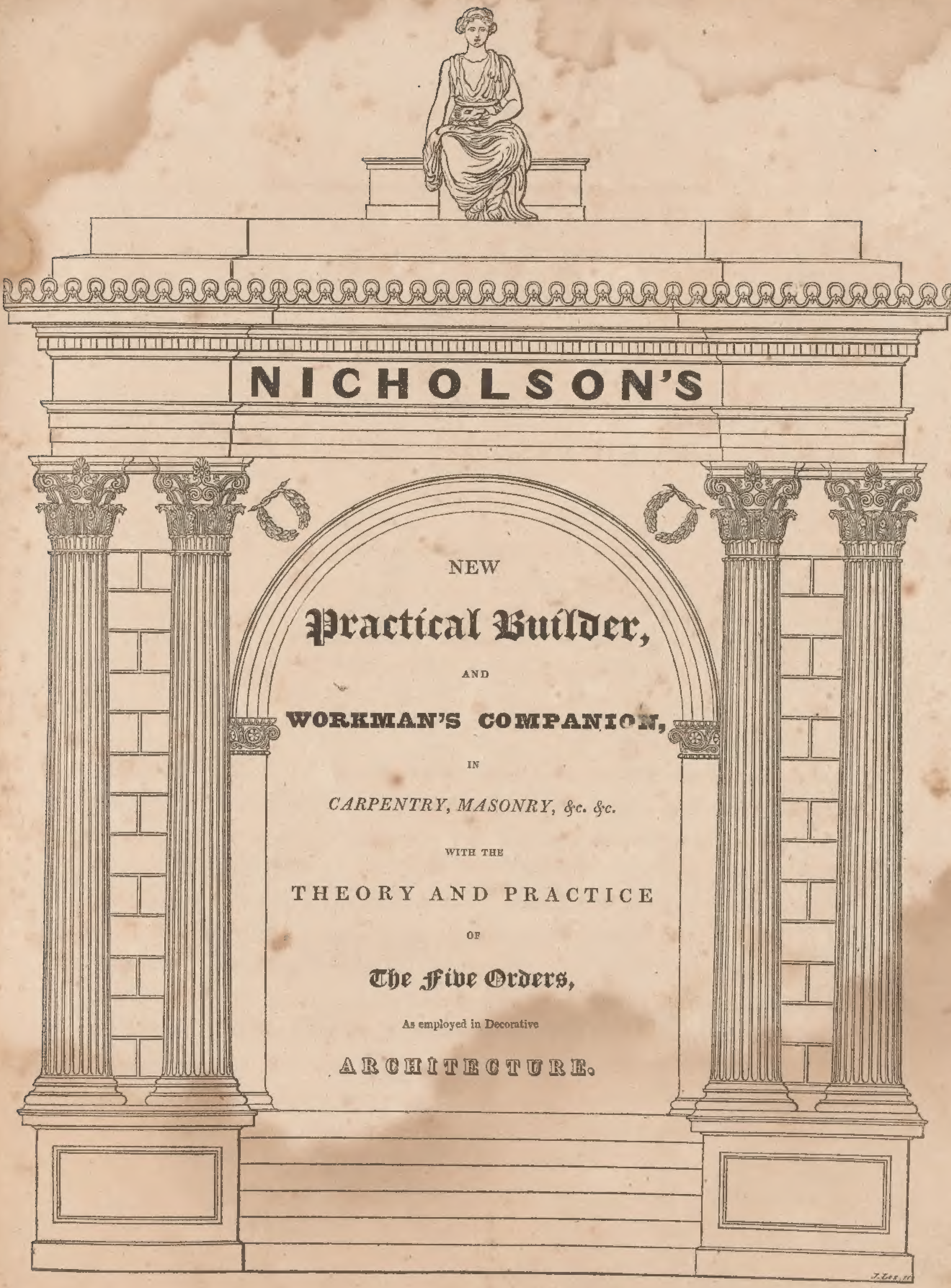

NICHOLSON'S
NEW
Practical Builder,
AND
WORKMAN'S COMPANION,
IN
CARPENTRY, MASONRY, &c. &c.
WITH THE
THEORY AND PRACTICE
OF
The Five Orders,
As employed in Decorative
ARCHITECTURE.

CHAPTER XVI.

THE THEORY AND PRACTICE OF THE FIVE ORDERS OF ARCHITECTURE,

WITH THE

Opinions thereon of the most distinguished Professors in the Art of Building,

AS PRESENTED, AT DIFFERENT PERIODS, TO THE SCIENTIFIC WORLD, BY SIR WILLIAM CHAMBERS, AND OTHER EMINENT ARCHITECTS, ANTIENT AND MODERN; FROM WHICH THE STUDENT, AS WELL AS THE AMATEUR, MAY COLLECT EVERY INFORMATION REQUISITE TO PROPORTION; AND DRAW AND EXECUTE EVERY PART OF THE SEVERAL ORDERS, WITH CORRECTNESS, SKILL, AND TASTE, IN THE PUREST STYLE.

THE ORDERS of ARCHITECTURE constitute the basis upon which, chiefly, the decorative part of the science is built, and towards which the attention of the architect must ever be cherished, even where *Orders* are not introduced: for, in them originate most of the forms used in decoration; they regulate most of the proportions; and to their combination, multiplied, varied, and arranged, in a thousand different ways, architecture is indebted for its most splendid productions.

These *Orders* are different modes of building, supposed to have been originally imitated from the primitive huts; being composed of such parts as were essential in their construction; and, afterwards, adopted in the temples of antiquity, which, though at first simple and rude, were, in the course of time, and by the ingenuity of succeeding architects, wrought up and improved to such a pitch of perfection, on different models, that each was, by way of eminence, denominated an ORDER.

Of these there are *Five:* three, said to be of Grecian origin, are called Grecian *Orders;* being distinguished by the names of *Doric, Ionic,* and *Corinthian;* they

exhibit three distinct characters of composition, supposed to have been suggested by the diversity of character in the human frame. The remaining two, being of Italian origin, are called Latin or Roman *Orders;* they are distinguished by the names of ***Tuscan*** and ***Roman,*** and were probably invented with a view of extending the characteristic bounds, on one side still farther towards strength and simplicity, as on the other, towards elegance and profusion of enrichments.

At what periods the *Orders* were invented, or by whom their improvement was advanced, we can now conjecture only from the structures and fragments of antiquity, built in different ages, and still remaining to be seen in various parts of Europe, Africa, and Asia. Of their origin, little is known but from the relation of Vitruvius, the veracity of which has been much questioned, and it is probably not altogether to be depended upon.

Of the two Latin *Orders,* the Tuscan is said to have been invented by the inhabitants of Tuscany, before the Romans had intercourse with the Greeks, or were acquainted with their arts and sciences. Probably, however, these people, originally a colony of Greeks, only imitated, in the best manner they could, what they remembered of the state of building, as it existed in their own country: simplifying the Doric, either to expedite their work, or, perhaps, to adapt it to the abilities of their workmen.

The second Latin Order, though of Roman production, is but of modern adoption; the antients never having considered it as a distinct *Order.* It is a mixture of the Ionic and Corinthian, and is now distinguished by the names of ***Roman,*** or *Composite.*

The ingenuity of man has, hitherto, not been able to produce a *Sixth Order,* though large premiums have been offered, and numerous attempts have been made, by means of first-rate talents to accomplish it. Such is the fettered state of human imagination, such the scanty store of its ideas, that Doric, Ionic, and Corinthian, have ever floated uppermost; and all that has been produced amounts to nothing more than different arrangements and combinations of their parts, with some trifling deviations scarcely deserving notice; the whole generally tending more to diminish than to increase the beauties of the antient orders.

The suppression of parts of the antient orders, with a view to produce novelty, has, of late years, been much practised among us, but with very little success. And, though it is not wished to restrain sallies of imagination, nor to discourage

genius from attempting to invent; yet it is apprehended that attempts to alter the primary forms invented by the antients, and established by the concurring approbation of many ages, must ever be attended with injurious consequences, must always be difficult, and seldom or never successful. It is like coining words, which, whatever may be their value, are at first but ill received, and must have the sanction of time to secure them a current reception.

An ORDER is composed of two principal members, the *Column* and the *Entablature;* each of which is divided into three principal parts. Those of the COLUMN are the *Base,* the *Shaft,* and the *Capital;* those of the ENTABLATURE, are the *Architrave,* the *Frieze,* and the *Cornice:* all these again are sub-divided into many smaller parts, the disposition, number, forms, and dimensions, of which characterize each order, and express the degree of strength or delicacy, richness or simplicity, peculiar to it. Columns of the Five Orders, with their respective names, are represented in *Plates* II. and III.

The simplest and most solid of these orders is the TUSCAN ORDER. It is composed of few and large parts, devoid of ornaments, and is of a construction so massive, that it seems capable of supporting the heaviest burdens; whence it is, by Sir Henry Wotton, compared to a sturdy labourer dressed in homely apparel.*

The DORIC ORDER, next in strength to the Tuscan, and of a grave, robust, or masculine, aspect, is by Scamozzi called the *Herculean.* Being the most antient of all the orders, it retains more of the primitive hut style in its form than any of the rest, having trigliphs in the frieze, to represent the ends of joists, and mutules in its cornice, to represent rafters, with inclined soffits, to express their direction in the originals, from which they were imitated. The Doric columns are often seen in antient works, executed without bases, in imitation of trees; and, in the primitive buildings, without any plinths to raise them above the ground. Freart de Cambrai, in speaking of this order,† observes, that delicate ornaments are repugnant to its characteristic solidity, and that it succeeds best in the simple regularity of its proportions: "Nosegays and garlands of flowers," says he, "grace not a Hercules, who always appears more becomingly with a rough club and lion's skin; for there are beauties of various sorts, and often so

* Vide Sir H. Wotton's *Elements of Architecture.*

† Freart de Cambrai was a learned architect of the seventeenth century, who died in 1676. He was employed by Louis XIII. to collect antiquities, and engage the ablest artists to reside in France.

dissimilar in their natures, that those which may be highly proper on one occasion, may be quite the reverse, even ridiculously absurd, in others."

The Ionic, being the second of the Grecian orders, holds a middle station between the other two, and stands in equipoise between the grave solidity of the Doric, and the elegant delicacy of the Corinthian. Among the antiques, however, we find it in different dresses; sometimes plentifully adorned, and inclining most towards the Corinthian; sometimes more simple, and bordering on Doric plainness; all according to the fancy of the architect, or nature of the structure where employed. It is throughout of a more slender constructure than either of the afore-described orders; its appearance, though simple, is graceful and majestic; its ornaments should be few, rather neat than luxuriant; and, as there ought to be nothing exaggerated, or affectedly striking in any of its parts, it is not unaptly compared, by Sir Henry Wotton,* to a sedate matron, rather in decent than magnificent attire.

"The Corinthian Order," says Sir Henry Wotton, "is a column lasciviously or extravagantly decked, like a wanton courtezan or woman of fashion. Its proportions are elegant in the extreme; every part of the order is divided into a great variety of members, and abundantly enriched with a diversity of ornaments." "The antients," says De Cambrai, "aiming at the representation of a feminine beauty, omitted nothing either calculated to embellish, or capable of perfecting, their work;" and he observes, "that, in the many examples left of the *Order*, such a profusion of different ornaments is introduced, that they seem to have exhausted imagination in the contrivance of decorations for this masterpiece of the art. Scamozzi calls it the *Virginal*, and it certainly has all the delicacy in its form, with all the gaiety, gaudiness, and affectation in its dress, peculiar to young women."†

The Composite Order is, properly speaking, only a different species of Corinthian, and distinguished from it merely by some peculiarities in the capital, and other trifling deviations.

To produce the most striking idea of their different properties, and to render the comparison between the Orders more easy, they are all represented of the

* Vide Sir H. Wotton's *Elements of Architecture.*

† Scamozzi, an architect of great talent, was born 1550, and succeeded Palladio in his chief employments at Vicenza, in Italy. *Palladio* was born in 1518; died in 1580, and was buried as shown hereafter, page 456.

same height; hence the gradual increase of delicacy and richness is at once perceivable, as will be likewise the relations between the intercolumniations of the different orders, when proportioned to their respective pedestals, imposts, archivolts, and other parts, with which they are, on various occasions, accompanied.

The PROPORTIONS of the ORDERS were, by the antients, formed on those of the human body; and, consequently, it could not be the intention to make a Corinthian column, which, as Vitruvius observes,* is to represent the delicacy of a young girl, as thick and much taller than a Doric one, which is designed to represent the bulk and vigour of a muscular full-grown man. Columns so formed could not be applied to accompany each other, without violating the laws both of real and apparent solidity; as, in such case, the Doric dwarf must be crushed under the superior Ionic, or the gigantic Corinthian proudly triumphant, and at once reversing the natural and necessary predominance of composition.

Nevertheless, Vignola, Palladio, Scamozzi, Blondel, Perrault, and many others, if not all the great modern architects, have considered them in this light; that is, have made the diameters of all their orders the same; and, consequently, their heights increasing; which, besides giving a wrong idea of the character of these different compositions, has laid a foundation for many erroneous precepts and false reasonings, to be found in different parts of their works.†

In order to exemplify what has been said, the reader is referred to *Plate* II. of the *Five Orders*, wherein they are represented of the same height; the inspection of which, when duly considered and compared, will, we are convinced, fully satisfy the contemplative reader, that the great authorities referred to were not correct in their notions as to the comparative proportions of the Five Orders, in representing them of different heights, that is, in reference to the doctrine of Vitruvius, who, nevertheless, has scientifically drawn all his inferences as to the

* *Vitruvius*, born at Formio, in Italy, was favoured by Julius Cæsar, and employed by Augustus, the succeeding emperor, in constructing public buildings and machinery. His treatise on architecture is well known.

† *Vignola* was born in 1507; died in 1573. He succeeded Michael Angelo as architect at St. Peter's, in Rome.

Blondel was a French architect, and an author of great eminence.

Perrault was also a French architect: he was born at Paris, 1613; died 1688. He was the greatest architect France ever produced.

general proportions of the orders from the human figure, which, though not in exact accordance with any known problems, may be easily traced in the study and construction of the human frame; wherein the most sublime definitions in the art of building are assimilated, and may thus be understood, without entering into intricate calculations, founded upon false principles of reasoning.

The learned editor of the late edition of Chambers' *Civil Architecture* observes, and with great truth, " That, to Palladio's birth and existence our country is especially indebted for its progress in architecture, and for the formation of a school which has done it honour, and given it a character of the first class, in the opinion of its continental neighbours. Among the names which that school enrols are those of Inigo Jones, Sir Christopher Wren, Colin Campbell, Nicholas Hawksmoor, Sir John Vanburgh, James Gibbs, Lord Burlington, Kent, Carr, of York, Sir Robert Taylor, Sir William Chambers, James Wyatt, and a long list of others, whose works reflect a lustre on the name of Palladio, which all the new churches and Grecian profiles of this age will never eclipse.

" Palladio," says the same learned writer, " at the age of sixty-two years, was snatched away from this world. His funeral was attended by all the Olympic Academicians of Vicenza, and his remains deposited in the church of Santa Corona, in that city. His figure was rather small, his countenance remarkably mild and benign, and the height of his forehead reminds us of our immortal Shakspeare. Palladio's demeanor and conduct was modest and obliging, and the esteem in which he was held, on these accounts, by all with whom he had business, is the strongest proof of the truth given of him by those who have written the history of his life, and have enumerated his various public works: and, from what has been stated, Palladio, in this country, may be considered the grand-sire of our art; and, as long as good taste prevails, his name will ever be revered, notwithstanding the pains which have been taken, by the enthusiastic admirers of Grecian architecture, to suppress the Roman style of building, as adopted by him, and which, by men of the most profound judgement, has been considered the best calculated to illustrate the most sublime, as well as the most tasteful, compositions. The detail of Grecian architecture is beautiful, and cannot fail to be admired by the lovers of the science; but, when compared in the aggregate, as regards its application to general compositions, it is inferior to the Roman style, inasmuch as its general proportions are too severe, and the parts too heavy to

be amalgamated in varied compositions, upon an extended scale, where *novelty* is required. Let it, however, be understood, that we are great admirers of Grecian architecture; at the same time, we feel it incumbent to direct the student to the consideration of Roman principles, and to guard him, if possible, against the prevailing effects of prejudice.

PROPORTIONS OF THE ORDERS.

In the opinion of Scamozzi, columns should not be less than seven of their diameters in height, nor more than ten; the former being, according to him, a good proportion in the Tuscan, and the latter in the Corinthian, order. The practice of the antients in their best works being conformable to this precept, we have, as authorised by the doctrine of Vitruvius, made the Tuscan *seven* diameters, and the Doric *eight;* the Ionic *nine,* as Palladio and Vignola have done; and the Corinthian and Composite *ten;* which last is a mean between the proportions observed in the Pantheon, at Rome, and at the three columns in the Campo Vaccino, both which are esteemed most excellent models of the Corinthian order.

The height of the entablatures, in all the orders, are made one quarter of the height of the Column; which was the common practice of the antients, who, in all sorts of entablatures, seldom exceeded or fell short of that measure.

Nevertheless, Palladio, Scamozzi, Alberti, Barbaro, Cataneo, Delorme, and others of the modern architects,* have made their entablatures much lower in the Ionic, Composite, and Corinthian, orders, than in the Tuscan or Doric. This, on some occasions, may not only be excusable, but highly proper; particularly where the intercolumniations are wide, as in a second or third order, in private houses, or inside decorations, where lightness should be preferred to dignity; and where expense, with every impediment to the conveniency of the fabric, are carefully

* *Leoni Baptista Alberti* was an Italian architect, of great eminence, who died in 1485.

Barbaro, born in 1513, and died in 1570, was an architect of much learning; he was ambassador from Venice to England, and left in 1551.

Cataneo was an Italian architect; he wrote a Commentary on Vitruvius.

Delorme was a French architect, born at Lyons, in the sixteenth century; he was the restorer of architecture in France.

to be avoided; but to set aside a proportion which seems to have had the general approbation of the antient architects, is surely presuming too far.

The reason alleged in favour of this practice is the weakness of the columns in the delicate orders, which renders them unfit for supporting heavy burdens; and where the intervals are fixed, as in a second order; or, in other places, where wide intercolumniations are either necessary, or not to be avoided, the reason is certainly sufficient; but, if the architect be at liberty to dispose his columns at pleasure, the simplest and the most natural way of conquering the difficulty is, to employ more columns, by placing them nearer to each other, as was the custom of the antients. And it must be remembered that, though the height of the entablature in a delicate order is made the same as in a massive one, yet it will not, either in reality or in appearance, be equally heavy; for the quantity of matter in the Corinthian cornice A, is considerably less than in the Tuscan cornice B,* and the increased number of parts composing the former will, of course, make it appear far lighter than the latter.

With regard to the parts of the entablature, we have followed the method of Serlio,† in his Ionic and Corinthian Orders; and of Perrault, who, in all his orders, except the Doric, divides the whole height of the entablature into ten equal parts, three of which he gives to the architrave, three to the frieze, and four to the cornice; and in the Doric *order*, he divides the whole height of the entablature into eight parts, of which two are given to the architrave, three to the frieze, and three to the cornice.

These measures deviate very little from those observed in the greatest number of antiques now extant at Rome, where they have stood the test of many ages, and their simplicity renders them singularly useful in composition, as they are easily remembered and easily applied.

Of two modes, used by antient and modern architects, to determine the dimensions of the mouldings, and the lesser parts that compose an order, we have chosen the simplest, readiest, and most accurate; which is, by the *Module*, or semi-diameter of the column, taken at the bottom of the shaft, and divided into thirty minutes.

* See the *plate*, No. 2, of *Orders*, all shewn of the same height.

† *Serlio* was a Bolognese, a disciple of Perriozzi, and was the first architect who measured and published the remains of Roman architecture; he died in the service of Francis I, 1552.

There are, indeed, many who prefer the method of measuring by equal parts, imagining beauty to depend on the simplicity and accuracy of the relations existing between the whole body and its members, and alleging that dimensions, which have evident affinities, are better remembered than those whose relations are too complicated to be immediately apprehended.

With regard to the former of these suppositions, it is evidently false; for the real relations subsisting between dissimilar figures, have not any connexion with the apparent ones; and, with regard to the latter, it may or may not be the case, according to the degree of accuracy with which the partition is made: for instance, in dividing the attic base, which may be numbered among the simplest compositions in architecture, according to the different methods, it appears as easy to recollect the numbers 10, $7\frac{1}{2}$, 1, $4\frac{3}{4}$, 1, $5\frac{3}{4}$, as to remember that the entire height of the base is to be divided into three equal parts; that two of these three are to be divided into four; that three of the four are to be divided into two; and that one of the two is to be divided into six, of which one is to be divided into three.

But, admitting that it were easier to remember the one than the other, it does not seem necessary, nor even advisable, in a science where a vast diversity of knowledge is required, to burden the memory with a thousand trifling dimensions. If the general proportions be known, it is all that is requisite in composing; and, when a design is to be executed, it is easy to have recourse to figured drawings, or to prints. The use of the module is universal, throughout the orders and all their appertenances; it marks their relation to each other; and, being susceptible of the minutest divisions, the dimensions may be speedily determined with the utmost accuracy; while the trouble, confusion, uncertainty, and loss of time, in measuring by equal parts, are very considerable, seeing it is necessary to form almost as many different scales as there are different parts to be divided.

Columns, in imitation of trees, from which they derive their origin, are tapered in the shafts. In the specimens of antiquity the diminution is variously performed: sometimes beginning from the foot of the shaft, at others from one quarter, or one-third, of its height; the lower part being left perfectly cylindrical. The former of these methods was most in use amongst the antients, and being the most natural, seems to claim the preference, though the latter has been almost universally practised by modern architects, from a supposition, perhaps, of its being more graceful, as it is more marked and strikingly perceptible.

"The first architects," says Monsieur Auzott, "probably made their columns in straight lines, in imitation of trees, so that their shaft was the frustum of the cone; but, finding this form abrupt and disagreeable, they made use of some curve, which, springing from the extremities of the superior and inferior diameters of the column swelled beyond the sides of the cone, and thus gave the most pleasing figure to the outline. Vitruvius, in the second chapter of his third book, mentions this practice; but in so obscure and cursory a manner, that his meaning has not been clearly understood; and several of the modern architects, intending to conform themselves to his doctrine, have made the diameters of their columns greater in the middle than at the foot of the shaft. Leoni Baptista Alberti,* with several of the Florentine and Roman architects, carried this practice to a very absurd excess, for which they have been justly blamed, it being neither natural, reasonable, nor beautiful."

Sir Henry Wotton, in his *Elements of Architecture,* says, in his usual quaint style, "And here I must take leave to blame a practice *growne* (I know not how) in *certaine* places too familiar of making *pillars* swell in the middle, as if they were *sicke* of some *tympany* or *dropsie,* without any *authentique* pattern or rule to my knowledge, and unseemly to the very judgement and sight."

And Monsieur Auzott further observes, "that a column, supposing its shaft to be the frustum of a cone, may have an additional thickness in the middle without being swelled in that part, beyond the bulk of its inferior parts, and supposes the addition, mentioned by Vitruvius, to signify not any thing more than the increase towards the middle of the column, occasioned by changing the straight line, which at first was in use, into a curve, and, by dextrous means, to 'snatch a grace beyond the reach of art.'"

The supposition of Auzott is extremely just, and founded on what is observable in the works of antiquity, where there is not any single instance of a column thicker in the middle than at the bottom, though all, or most of them, have the swelling hinted at by Vitruvius, all of them being terminated by curves; some few granite columns excepted, which are bounded by straight lines: a proof,

* "This classical author, Alberti, divides the height of the column into seven parts, and places the greatest swelling at the height of the third division of these parts from the base; so that he assumes the doctrine of Vitruvius by the strict letter, conceiving his meaning to be that the swelling is very near the middle of the height of the column."

perhaps, of their antiquity, or of their having been wrought in the quarries of Egypt by unskilful workmen.

Blondel, an eminent French architect already noticed, in a work written by him, and entitled "*Resolution des quatre principaux Problêms d'Architecture*," teaches various modes of diminishing columns; the best and simplest of which is by means of the instrument invented by *Nicomedes*, to describe the first conchoid: for this, being applied to the bottom of the shaft, performs, at one sweep, both the swelling and the diminution; giving such a graceful form to the column, that it is universally allowed to be the most perfect practice hitherto discovered. The columns in the Pantheon, at Rome, accounted the most beautiful among the antiques, are traced in this manner, as appears by the exact measures of one of them, to be found in Desgotez's Antiquities of Rome.*

To give a clear idea of the operation, it will be necessary first to describe Vignola's diminution, on which it is grounded. "As to this second method," says Vignola, "it is a discovery of my own; and, although it is less known than the former, it will be easily comprehended by the figure."†

Having, therefore, determined the measures of your column, (that is to say, the height of the shaft, and its inferior and superior diameters,) draw a line, indefinitely, from C through D, perpendicular to the axis of the column: this done, set off the distance CD, which is the inferior semi-diameter from A, the extreme point of the superior semi-diameter, to B, a point in the axis. Then, from A, through B, draw the line ABE, which will cut the indefinite line CD in E; and from this point of intersection, E, draw, through the axis of the column, any number of rays, as E*b a*, on each of which, from the axis towards the circumference, setting off the interval CD, you may form any number of points *a, a, a,* through which, if a curve be drawn, it will describe the swelling and diminution of the column, and produce the most graceful contour.

This method has been considered sufficiently accurate for practice, and especially if a considerable number of points be found; yet, strictly speaking, it is

* *Desgotez* was a French architect of considerable research, and his works are highly esteemed. The student is cautioned against Marshall's translation; the latter was published in London, 1771, the original in Paris, in 1682.

† Vide *Plate* I, of *Orders*, in which the instrument invented by Nicomedes is fully described; and likewise the manner of drawing the several legitimate mouldings adverted to, as appertaining to the Theory and Practice of the Five Orders.

defective; as the curve must either be drawn by hand, or by applying a flexible rule to all the points; both of which are liable to variations. Blondel, therefore, to obviate this objection, (after having proved the curve, passing from A to C, through the points *aa*, to be of the same nature with the first conchoid of the antients,) employed the instrument of Nicomedes to describe it, the construction of which is as follows:—

Having determined, as above, the length of the shaft, with the inferior and superior diameters of the column; and having, likewise, found the length of the line CDE, take three rules, either of wood or metal, as FG, ID, and AH; of which let FG and ID be fastened together at right angles, in G. Cut a dovetail groove in the middle of FG, from top to bottom; and, at the point E, on the rule ID, (whose distance from the middle of the groove in FG is the same as that of the point of intersection from the axis of the column,) fix a pin; then, in the rule AH, set off the distance AB equal to CD, the inferior semi-diameter of the column; and, at the point B, fix a button, whose head must be exactly fitted to the groove made in FG, in which it is to slide; and, at the other extremity of the rule AH, cut a slit or channel from HCK, whose length must not be less than the difference of length between EB and ED, and whose breadth must be sufficient to admit the pin fixed at E, which must pass through the slit, that the rule may slide thereon.

The instrument being thus completed, if the middle groove in the rule FG be placed exactly over the axis of the column, it is evident that the rule AH, in moving along the groove, will, with its extremity A, describe A, *a*, *a*, C; which curve is the same as that produced by Vignola's method of diminution, supposing it done with the utmost accuracy: for the interval AB, *ab*, is always the same, and the point E is the origin of an infinity of lines, of which the points BA, *ba*, *ba*, extending from the axis to the circumference, are equal to each other and to DC. And, if the rules be of an indefinite size, and the pins at E and B be made to move along their respective rules, so that the intervals, AB and DE, may be augmented or diminished at pleasure; it is likewise evident that the same instrument may be thus applied to columns of any size.

In the remains of antiquity, the quantity of diminution at the upper diameter of columns is various; but seldom less than one-eighth of the inferior diameter of the column, nor more than one-sixth of it. The last of these is, by Vitruvius,

esteemed the most perfect, and Vignola has employed it in four of his Orders. as we have in all of them; there being no reason for diminishing the Tuscan column more, in proportion to its diameter, than any of the rest; though it be the doctrine of Vitruvius, and the practice of Palladio, Vignola, Scamozzi, and almost all the modern architects. On the contrary, as Monsieur Perrault justly observes, its diminution ought to be rather less than more; as it actually is in the Trajan column, at Rome, being there only one-ninth of the diameter. For, even where the same proportion is observed through all the orders, the absolute quantity of the diminution in the Tuscan Order, supposing the columns of the same height, exceeds that in the Corinthian in the ratio of ten to seven; and if, according to the common practice, the Tuscan Column be less by one quarter at the top than at its foot, the difference between the diminution in the Tuscan and in the Corinthian columns will be as fifteen to seven; and in the Tuscan and Doric nearly as fifteen to nine: so that, notwithstanding there is a considerable difference between the lower diameters of a Tuscan and of a Doric column, both being of the same height, yet their diameters at the top will be nearly equal; and, consequently, the Tuscan will not, in reality, be any stronger than the Doric one; which is contrary to the character of the order.

Vitruvius, in his third Book, chapter the third, allots different degrees of diminution to columns of various heights; giving to those of fifteen feet one-sixth of their diameter; to such as are from twenty to thirty feet, one-seventh; and when they are from forty to fifty feet high, one-eighth only: observing that, as the eye is easily deceived in viewing distant objects, which always appear less than they really are, it is necessary to remedy the deception by an increase of their dimensions: otherwise the work will appear ill-constructed and disagreeable to the eye.

Most of the modern architects have taught the same doctrine: but Perrault, in his notes, both on this passage, and on the second chapter of the sixth book, endeavours to prove the absurdity thereof. In fact, it is, on most occasions, if not on all, an evident error; which Vitruvius and his followers have probably been led into, through neglect of combining circumstances. For, if the validity of Perrault's arguments be not assented to, and it is required to judge according to the rigour of optical laws, it must be remembered, that, the proper point of view for a column of fifty feet high, is not the same as for one of fifteen: but, on the contrary, more distant, in the same proportion as the column is higher: and

that, consequently, the apparent relation between the lower and upper diameters of the column will be the same, whatever be its size. For if we suppose* A to be a point of view, whose respective distance from each of the columns, fg, FG, is equal to the respective heights of each, the triangles fAg, FAG, will be similar; and Af, or Ah, which is the same, will be to Ag, as AF, or its equal AH, is to AG: therefore if de be in reality to bc, as DE is to BC, it will likewise be apparently so; for the angle dAc will then be to the angle bAc, as the angle DAE is to the angle BAC; and if the real relations differ, the apparent ones will also differ.

The eye of the spectator is supposed to be in a line perpendicular to the foot of the shaft; but if the columns be proportionately raised to any height above the eye, the argument will remain in force, as the point in view must of course be proportionately more distant; and even when columns are placed immediately on the ground, which seldom or ever is the case, the alteration occasioned by that situation is too trifling to deserve notice.

When, therefore, a certain degree of diminution, which, by experience, is found pleasing, has been fixed upon, there will not be any necessity for changing it, whatever be the height of the column, provided the point of view is not limited; but, in those places where the spectator is not at liberty to choose a proper distance for his point of sight, which must be almost invariably the case in viewing the public buildings of the metropolis, the architect, if he inclines to be scrupulously accurate, may take the liberty to vary the diminutions according to the situation. But, in reality, it is not a matter of any great importance; as, in all probability, the nearness of the object will render the image thereof indistinct; and, consequently, any small alteration imperceptible.

Scamozzi, who esteems it an essential property of the delicate order to exceed the massy ones in height, has applied the above cited precept of Vitruvius to the different orders: having diminished the Tuscan column one quarter of its diameter; the Doric one-fifth; the Ionic one-sixth; the Roman or Composite one-seventh; and, the Corinthian one-eighth. In the preceding part of these definitions upon the subject, the fallacy of Vitruvius' ideas has been shown, upon principles which cannot be set aside, that is, with respect to the heights of his orders, and where the error of reducing the Tuscan column more than any

* Vide *Orders, Plate* I, containing Nicomedes' diagram of swelling columns, &c.

of the others has been proved, and which diminution is illustrated by the foregoing arguments: so that it is needless to say any thing further on the subject now; for, as the case is similar, the same reasoning may be employed in continuation.

The intention being to give an exact idea of the orders of the antients, they are represented under such figures and proportions as appear to have been most in use in the esteemed works of the Romans and Grecians, who, in the opinions of the most eminent writers, carried architecture to the highest degree of perfection. It must not, however, be imagined that the same general proportions will, on all occasions, succeed. Those which we prefer have been collected chiefly from the temples and other public structures of antiquity, and may be employed in churches, palaces, and other buildings of magnificence, where majesty and grandeur of manner should be extended to their utmost limits. Where the whole composition is generally large, the parts require an extraordinary degree of boldness, to make them distinctly perceptible from the proper general points of view: but, in less considerable edifices, and under various circumstances, of which details will hereafter be given, more suitable, and perhaps more elegant, proportions may often be designed by the ingenuity of man.

An ORDER of ARCHITECTURE, as before observed, consists of two grand parts, the *Column* and the *Entablature*. The COLUMN comprises the *Base, Shaft,* and *Capital;* and the ENTABLATURE, the *Architrave, Frieze,* and *Cornice;* each of which parts must be divided, subdivided, and arranged, as hereinafter described, by the several figured engravings, which will teach the reader not only how to draw but to construct the several orders upon the most correct principles.

DEFINITIONS, &c.

IF A CIRCULAR COLUMN has no base, it is called a *frustum column;* but, if it has one, the shaft, base, and capital, altogether, form the *Column,* and the mass supported by the column, is denominated the *Entablature.*

The beam, which is presumed to rest upon the column, and forms the lowest part of the entablature, is called the ARCHITRAVE, or *Epistylium.*

The space comprehended between the upper side of the architrave or epistylium, and the under side of the presumed beam over the joists, is called the Frieze, or *Frize*, or *Zophorus.*

The profile, or edge of the presumed inclined roof, upheld by the joists, or cross beams, projecting beyond the face of the frieze or zophorus, is called the Cornice.

The thickest or lowest part of the column is called the *lower diameter;* and the slenderest or uppermost part of the column is called the *upper diameter.*

Half the lower diameter is called a *Module,* which, being divided into thirty equal parts, these are called *Minutes;* by this scale every part appertaining to the order is regulated, both as regards the altitude and projection of the several component parts, each of which are minutely represented in the particular engravings of the Five Orders hereafter.

The depth of the column, from the lowest part of the architrave to the upper diameter, or slenderest part of the column, is called the Capital.

The space comprehended between the upper diameter, or slenderest part of the column, and the lower diameter, or thickest part of the same, is called the Shaft: and the space, if any, between the pedestal, or step, is called the Base; but if without any, of course the column must then rest upon the step, as in the Grecian, Doric, &c.

The smallest spaces between the lower diameters of columns, standing in the same range, are called intercolumniations.

When intercolumniations are one diameter and a half of the lower diameters of columns, they are called *pycnostyle,* or columns set thickly.

When the intercolumniations are two diameters of the lower diameters, they are called *systyle.*

When the intercolumniations are two and one quarter of the lower diameters, they are called *eustyle.*

When the intercolumniations are three diameters of the lower diameters, they are called *decastyle.*

When the intercolumniations are four diameters of the lower diameters of columns, they are called *œosystyle*, or columns set thinly; in which case they may be coupled, in the manner of the portico in the west front of St. Paul's, London, and many other grand edifices.

When porticos consist of four columns, with three intercolumniations, they are called *tetrastyle;* with six columns, *hexastyle;* with eight columns, *octastyle:* and, in like manner, according to the number of columns, they are identified by Latin terms, which may be created *ad infinitum.*

Porticos to public buildings, with six, eight, or ten, columns, are the most esteemed; yet, among the antient buildings, beautiful examples, with four columns only, are frequent; as, for instance, the much admired Doric portico at Athens, and the Ionic specimen on the river Ilissus, and many others executed under the direction of Grecian and Roman architects; the details of which cannot fail to be duly appreciated.

MOULDINGS, ORNAMENTS, &c.

A LITTLE digression here may be useful to the practical student; to whom we earnestly recommend a second perusal of the preceding parts of this chapter; and, subsequently, to copy the engravings, making his drawings, double, treble, or quadruple, the sizes of the originals, by which means he will presently acquire a thorough acquaintance with the different parts of the orders; and, by degrees, will be able to compose, design, and execute, architectural subjects, with ease and comfort to himself, and satisfaction to his employers.

Having explained the more general, we shall now proceed to illustrate all the detailed, parts of the different orders, with their properties, application, and enrichments, as regards the theory of MOULDINGS.

As in all other arts, so in architecture, there are certain elementary forms, which, though simple in their nature, and few in number, are the principal constituent objects of every composition; however complicated or extensive it may be.

Of these there are, in this science, two distinct sorts; the first consisting of such parts as represent those that were essentially necessary in the construction of the primitive huts, as the shaft of the column, with the plinth of its base, and the abacus of its capital; representing upright trees, with the stones used to raise and to cover them, likewise the architrave and trigliph, representing the

beams and joists; the mutules, modillions, and dentils, either representing the rafters, or some other pieces of timber employed to support the covering: and the corona, representing the beds of materials which composed the covering itself. All these are properly distinguished by the appellation of *essential parts*, and form the first class. The subservient members, contrived for the use and ornament of these, and intended either to support, to shelter, or to unite them gracefully together, which are usually called MOULDINGS, constitute the second class.

The *essential* parts were, most probably, the only ones employed, even in the first stone buildings; as may be collected from some antient specimens yet remaining: for the architects of those early times, had certainly very imperfect ideas of beauty in the productions of art, and therefore contented themselves with barely imitating the rude model before them: but at length comparing the works of their own hands with animal and vegetable productions, each species of which is composed of a great diversity of forms, affording an inexhaustible fund of amusement to the mind, they could not but conceive a disgust at the frequent repetition of square figures in their buildings, and therefore thought of introducing certain intermediate parts, which might seem to be of some use, and, at the same time, be so formed, as to give a more varied and pleasing appearance to the whole composition; and this, in all probability, was the origin of mouldings.

Of REGULAR MOULDINGS there are but eight; the names of which are, the *Ovolo*, the *Talon*, the *Cyma*, the *Cavetto*, the *Torus*, the *Astragal*, the *Scotia*, and the *Fillet*.*

The names of these are allusive to their forms; and their forms are adapted to the uses which they are intended to serve. The *Ovolo* and *Talon*, being strong at their extremities, are fit for supports. The *Cyma* and *Cavetto*, though improper for that purpose, as they are weak in the extreme parts, and terminate in a point, are well contrived for coverings to shelter other members: the tendency of their outline being very opposite to the direction of falling water, which, for that reason, cannot glide along their surface, but must necessarily drop from it. The *Torus* and *Astragal*, shaped like ropes, are intended to bind and strengthen the parts on which they are employed; and the use of the *Fillet* and *Scotia* is only to separate, contrast, and strengthen, the effect of other mouldings; to give

* Vide *Plate* I. of *Mouldings*, &c.

a graceful turn to the profile, and to prevent that confusion which would be occasioned by joining several convex members together.

That the inventors of these forms meant to express something by these different figures, will scarcely be denied; and that the above-mentioned were their destinations, may be deduced not only from their figures, but from the practice of the antients in their most esteemed works: for, if we examine the Pantheon, the three columns of Campo Vaccino, the Temple of Jupiter Tonans, the fragments of the Frontispiece of Nero, the Basilica of Antonius, the Forum of Nerva, the Arches of Titus and Septimus Severus, the Theatre of Marcellus, and almost every antient building, either at Rome, or in other parts of Italy, France, or elsewhere, it will be found, that, in all their profiles, the *Cyma* and the *Cavetto* are constantly used as finishings, and never applied where strength is required: that the *Ovolo* and *Talon* are always employed as supporters to the essential members of the composition, such as the modillions, dentils, and coronas.

The chief use of the *Torus* and *Astragal* is, to fortify the tops and bottoms of columns, and sometimes of pedestals, where they are frequently cut in the form of ropes: as in the Trajan column, in the Temple of Concord, and in several fragments which are to be seen at Rome, and in other antient edifices, at places where architecture has been most encouraged.

The *Scotia* is employed only to separate the members of bases, for which purpose the *Fillet* is likewise used, not only in bases, but in all kinds of profiles.*

Mr. Gwilt, a modern author, very justly observes, although it is not mentioned in Chambers, that the *Ovolo* should be used only above the level of the eye of the spectator; that the *Cavetto* ought not to be seen in bases or capitals; that the *Cyma-recta* ought to be used only in crowning members; the *Scotia* below the eye; and the *Fillet* when required to separate the curved parts.

The same author furthermore appositely remarks that, in these days, all sense in the application of appropriate forms in mouldings seems extinct, and Palladio set at defiance. In addition, he states that, the artist or artisan who can now produce the newest and most extraordinary moulding in projecting an order, is considered as the greatest genius. These observations are founded in truth.

Without paying any attention to the *whims* of the day, it may be safely inferred, as Chambers remarks, that there is something positive and natural in the *primary*

* For the History of Mouldings, and their origin, *vide* Evelyn's Account of Architects and Architecture.

forms of architecture; and, consequently, in the subordinate parts: and that Palladio erred in employing the Cavetto under the Corona, in three of his orders, and in making such frequent use, through all his profiles, of the Cyma, as a supporting member. Nor has Vignola been more judicious in finishing his Tuscan cornice with an Ovolo; a moulding extremely improper for that purpose, and productive of a very disagreeable effect: for it gives a mutilated air to the entire of the profile, so much the more striking as it resembles exactly that half of the Ionic cornice, which is under the Corona. Other architects have been guilty of similar improprieties, and are therefore equally blameable.

Various are the MODES of DESCRIBING the CONTOUR OF OUTLINE of ROMAN MOULDINGS; the simplest, however, and the best, is to form them of quadrants of circles, as shown in the first plate of *Orders*, by which means the different depressions and swellings will be more strongly marked; the transitions be made without any angles, and the projections be agreeable to the doctrines of Vitruvius, and the practice of the antients: those of the Ovolo, Talon, Cyma, and Cavetto, being each equal to their height; that of the Scotia to one-third, and those of the curved parts of the Torus or Astragal to one-half of their heights.

On particular occasions, however, it may sometimes be necessary to increase, and at other times to diminish, these projections, according to the situation or other circumstances attending the profile; and where it so happens, the Ovolo, Talon, Cyma, and Cavetto, may be either described from the summits of equilateral triangles, or be composed of the quadrants of the ellipses, in the Grecian manner; of which the latter should be preferred, as it produces a stronger contrast of light and shade, and therefore marks the forms more distinctly.

The Scotia may be likewise framed of elliptical portions, or quadrants, of the circle, varying more or less from each other; by which mean, its projection may be either increased or diminished: but the curved part of the Torus or Astragal should be semi-circular, in imitation of the Roman manner, and the increase in the projection be made by straight lines: but when, in imitation of the superior Grecian style of moulding, the upper part of the Torus should be flatter than the lower, and be regulated according to the altitude of the mouldings from the ground: the pleasing effects of this method of profiling is observable in the contour of all the Torus mouldings in the Bank of England, where the ingenious architect has very judiciously introduced, as the prevailing order of the exterior,

MOULDINGS.

Fig 1

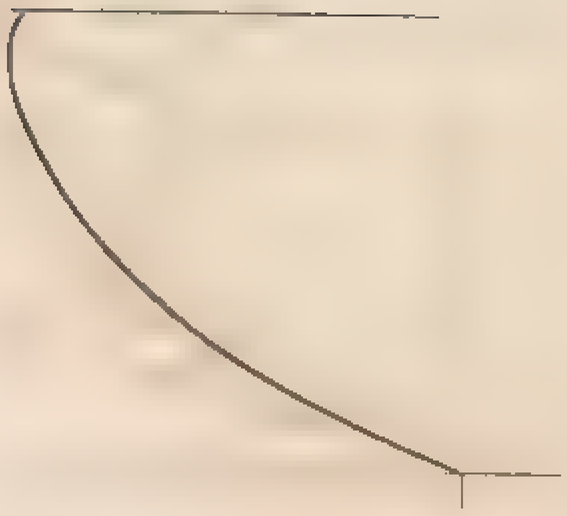


Fig 2

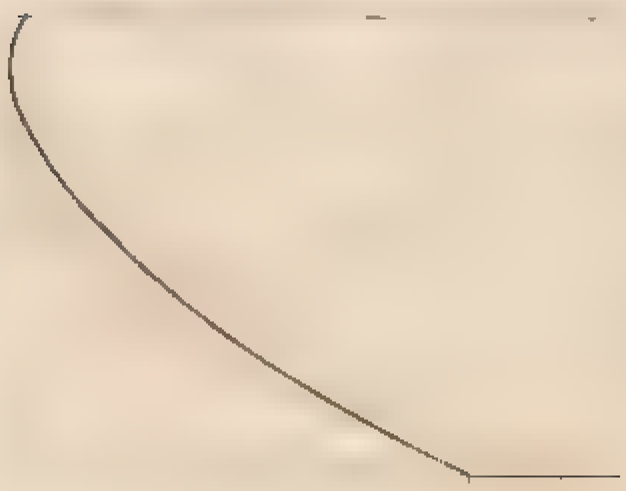


Fig 3

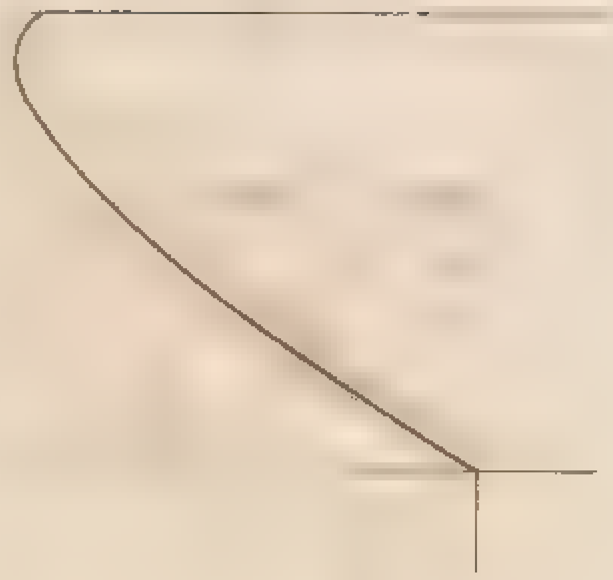


Fig 4

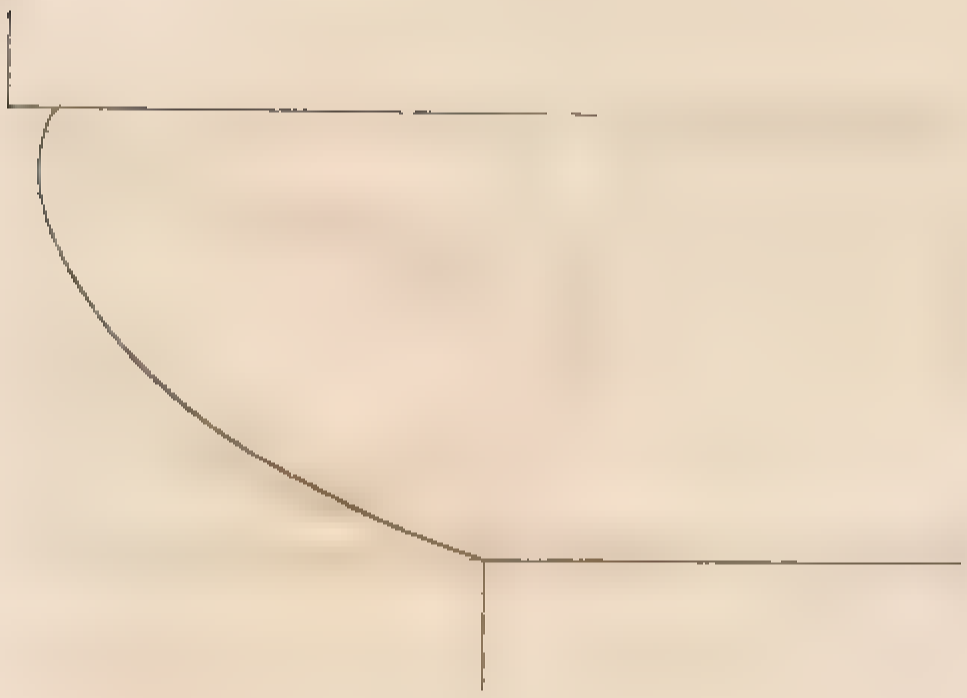
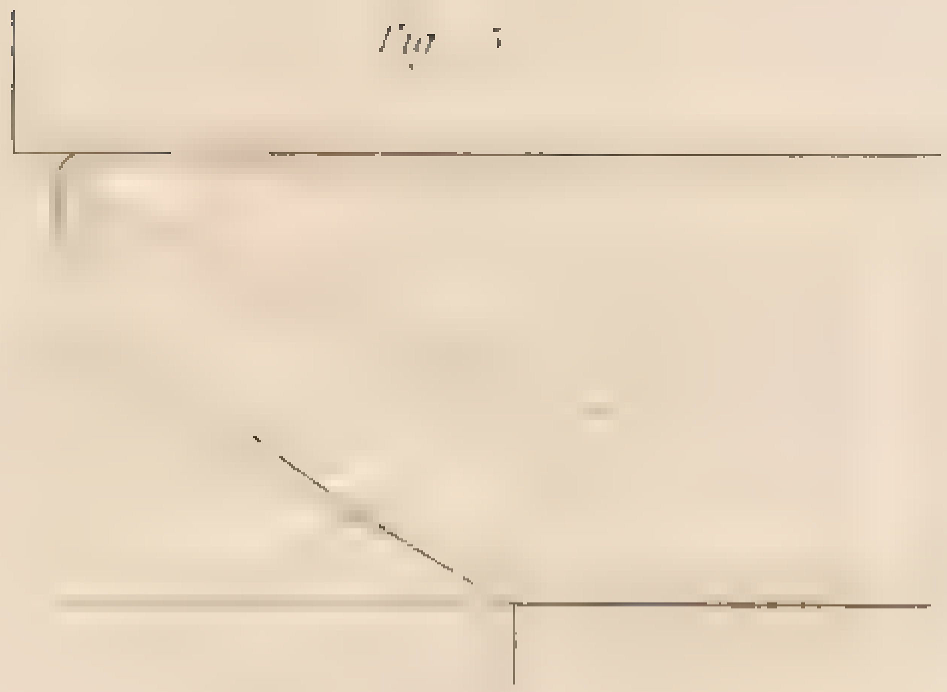


Fig 5



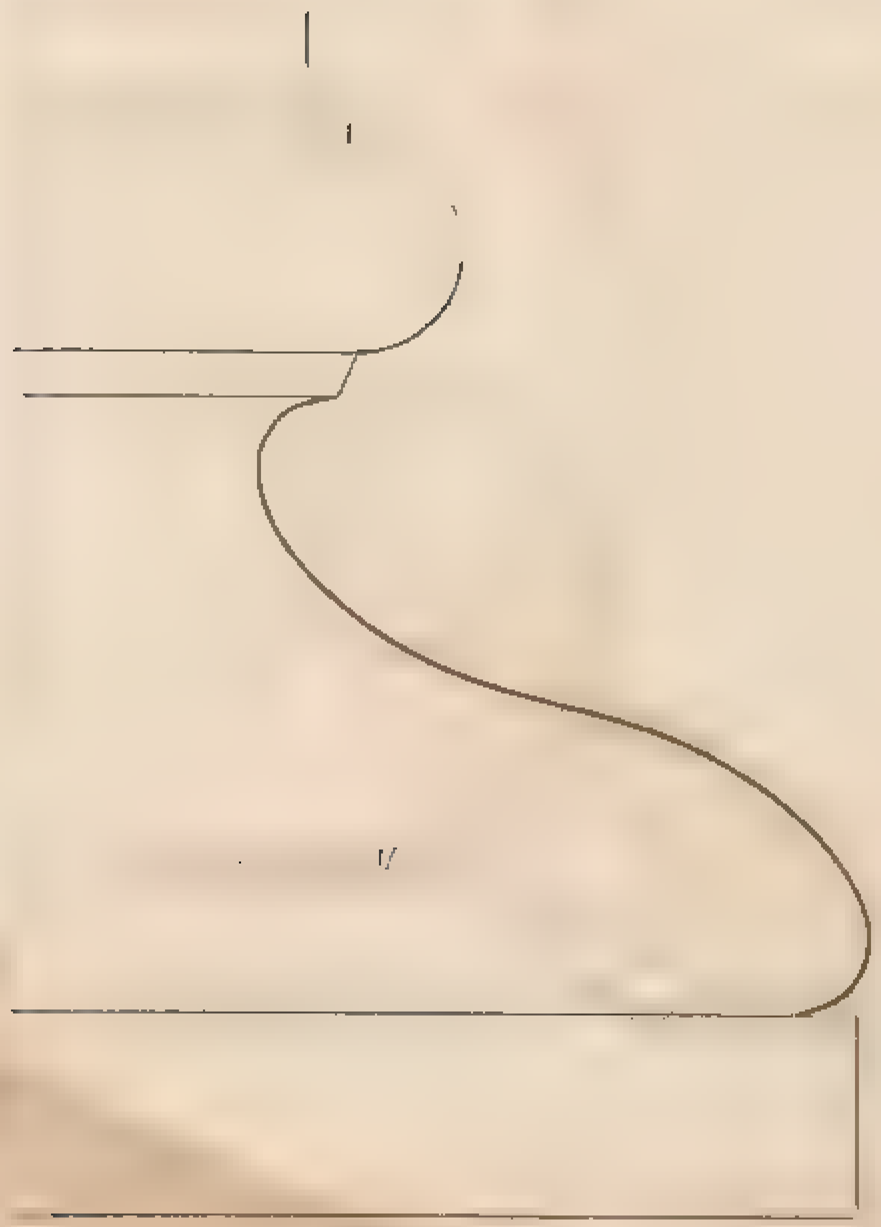
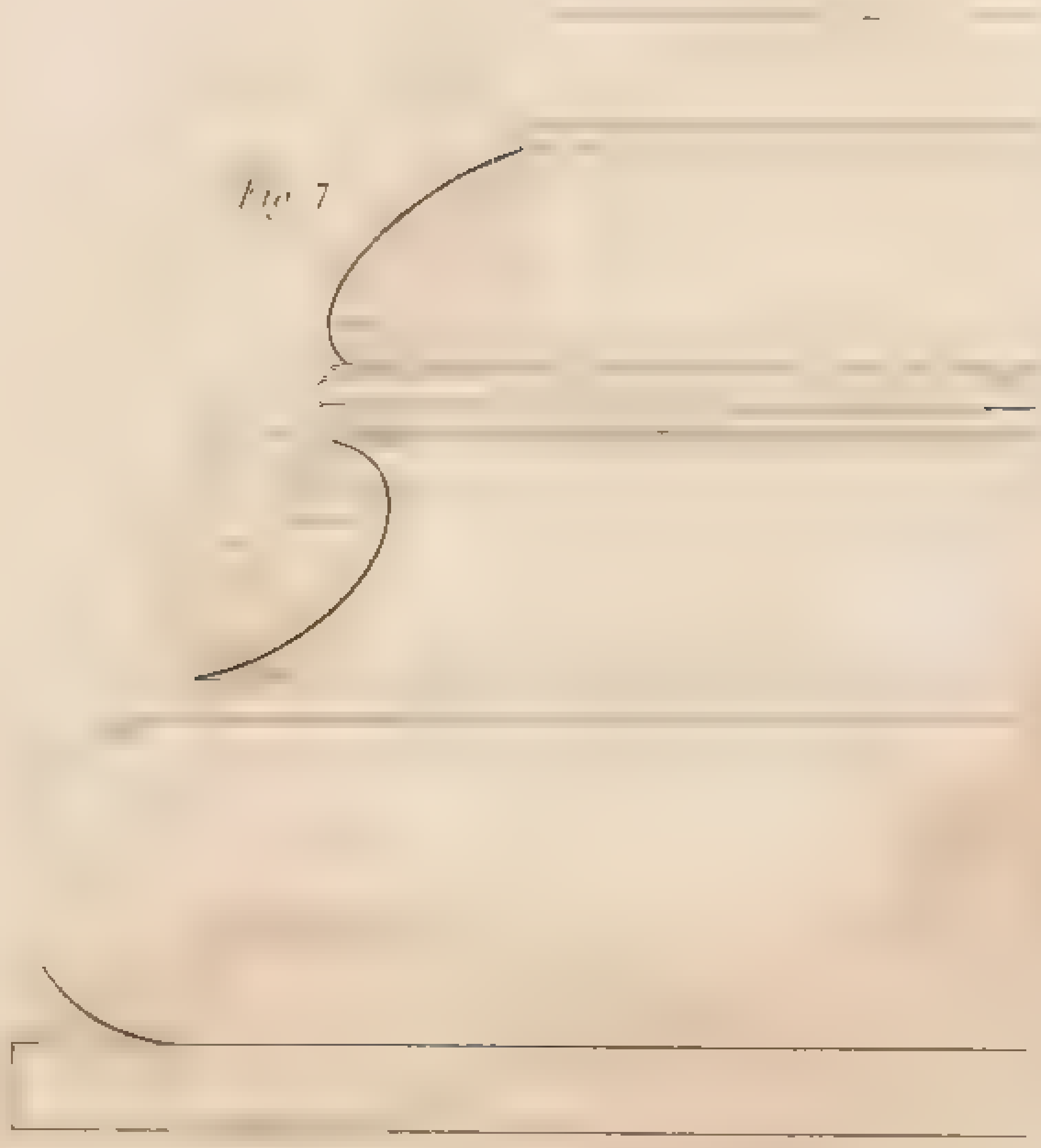


Fig 7



one of the best specimens of Roman art, of the Corinthian order, in the adoption of the beautiful example taken from the Temple of Vesta, at Tivoli; in which instance, the mouldings, meaning those of the Bank, altogether participate in the Grecian character, and we have been induced particularly to notice that magnificent building as a striking proof of the good taste of the Professor of Architecture at the Royal Academy, whose classic feeling for the association of Roman and Grecian architecture is every where manifested in the well-arranged building adverted to; that is, where the original style of the architecture has been metamorphosed.

The Ovolo, adopted by the Grecian architects, differs widely from the Roman specimen; its contour, in most cases, is a part of the ellipsis; in some instances it is hyperbolic; and, in some examples, it approximates to a straight line.

In Grecian architecture, the Elliptical Ovolo, or Echinus, is introduced into cornices, architraves, and also into the capitals of the Ionic and Doric orders; in the latter of which it forms a very conspicuous feature. The Ovolo, or Echinus, in the capitals of the Doric portico at Athens, the temple at Corinth, and those of Pæstum in Italy, are each of them elliptical; the hyperbolic form is also prevalent, and frequently to be met with in Athenian buildings, particularly in the Temples of Minerva and Theseus, and likewise in the capitals of the columns of the *Propylea*, the magnificent entrance to the citadel of Athens. The buildings last adverted to were erected during the administration of Pericles, 444 to 429 B.C. In the capitals of the columns, in the portico of Philip, king of Macedon, the echinus is a straight line, as well as in other antient buildings; examples and profiles of which are given throughout this work for the instruction of the practical builder.

In Roman architecture, the Ovolo, or echinus is invariably some portion of a circle; seldom or ever exceeding the quantity of degrees contained in the quadrant, but very frequently less. The hollow or Cavetto moulding is very frequently met with in Roman buildings, but it is not a favorite moulding, nor do we find many specimens of it in the remains of Grecian architecture. In the latter, we find the Doric Cymatium under the fillet of a finishing or crown moulding: but in Roman specimens, few, if any, examples can be produced.

The Cyma-recta, in Grecian and Roman architecture, is very nearly of the same shape and character, and is likewise applied for similar purposes. The

Cyma-reversa, in Grecian and Roman architecture, likewise approximate each other in degrees of similitude, and in one of the best specimens of Roman buildings it is applied under the fillets of the crown mouldings of cornices; but, in Grecian buildings, we do not remember any example, except in the portico of Philip, king of Macedon, to which the reader is referred, in the series of engraved Grecian profiles, to be seen in various architectural works.

The quirk, or bending inwards, of the uppermost edge of the Grecian ovolo or echinus, produces, when the sun shines on its surface, the most beautiful variety of light and shade; this relieves it considerably from the adjoining plain surface; and, if entirely obscured in shadow, it will borrow a reflected light, and the quirking or turning inward at the top will also occasion a large portion of shade, which likewise, under peculiar circumstances, is calculated to produce the most pleasing effect.

In the Roman echinus or ovolo, there is not any quirk at the top; and the consequence is, when the sun shines on its surface, it does not appear so interesting on its upper edge, as the Grecian echinus; nor will it produce such a beautiful line of distinction in connexion with mouldings which are combined, that is, when under shadow or lighted by reflection.

In the Grecian Cyma-reversa, the quirk, or turning in of its upper edge, and the turning out or bending of the under edge, will be most advantageously seen when the sun shines remarkably bright on those edges; which will, in a great measure, relieve it from the surrounding perpendicular surfaces, when adjoining to or combined together; and when under shadow, and lighted by reflection, the inclination of the superior and inferior edges will likewise produce the strongest line of distinction on each of the edges; that is, between it and the other mouldings.

Now let us examine the difference in effect between the Grecian example and the Roman, and it will be presently seen how much superior the Grecian style of moulding is over that of the Roman. The superior and inferior edges of the Roman Cyma-reversa, being perpendicular to the horizon, the place lightest on the surface will not be a single degree lighter, nor will it be, in the remotest manner, better relieved under shadow than perpendicular surfaces exhibited under the same circumstances. By a comparative view, therefore, of the most scientific principle of composing mouldings, it is manifest that the Grecian architects were better skilled in designing the minutiæ and detail of architecture than

those of the Roman school; the practical student will therefore act wisely by studying the beautiful contour of the Grecian mouldings, as well as the ornaments adapted to them; taking care to avoid, where it is consistent, the stringy or *liney* effect of the ornaments peculiar to the Grecian specimens. The Romans, in designing their foliage, as by reference to the best examples may be seen, exceeded the former in luxuriance of fancy and richness of style; but, in purity and correctness of taste, they were inferior in the composition of ornaments suited to the various mouldings which constitute the component parts of the most antient orders.

Taking, therefore, into consideration the beauties of Grecian and Roman ornaments, we are of opinion that the student should carefully copy, draw, and examine, the ornaments of each style; and thus he will, if industrious, be able in the course of time to discriminate, and to extract, with truth, taste, and judgement, the beauties of Roman and Grecian ornaments; and, consequently, form a style peculiar to himself. The man who condescends to be a slavish copiest, on all occasions, is unworthy of the honourable appellation of an architect.

It has been stated that Michael Angelo, the greatest architect, painter, and sculptor, of his time, once observed, that he who followed another was sure to be behind. Let every student, therefore, soar as high as his competitor; and, by degrees, he will arrive at excellence, and obtain the meed due to his labour: the wreath of honest fame which cannot be purchased by the riches of Mexico or Peru.

An assemblage of essential parts and mouldings, is termed a PROFILE; and on the choice, disposition, and proportions, of these depend the beauty or deformity of the composition. The most perfect profiles are such as consist of few mouldings: varied, both in form and size; fitly applied, with regard to their uses; and so distributed that the straight and curved ones succeed each other alternately. In every profile there should be a predominant member, to which all the others ought to appear subservient, and made either to support or to fortify it, or to shelter it from injuries of weather: and, wherever the profile is considerable, or much complicated, the predominant member should always be accompanied with one or more other principal members, in form and dimension calculated to attract the eye, create momentary pauses, and assist the perception of the beholder. These predominant and principal members ought always to be of the essential

class, and generally rectangular. Thus, in a cornice, the corona predominates; the modillions and dentils are principals in the composition; the cyma and cavetto cover them; the ovolo and talon support them.

When ornaments are employed to decorate profiles, some of the mouldings should always be left plain, in order to form a proper repose: for when all are enriched, the figure of the profile is lost in confusion. In the cornices of the entablatures, the coronas should not be ornamented, nor the modillion-bands, nor the other different fascias of the architraves: neither should the plinths of columns, fillets, nor scarcely any square member, be carved. For, generally speaking, they are either principal in compositions, or applied as boundaries to other parts; in each of which instances their figures should be simple, distinct, and unembarrassed. The dentil-bands should remain uncut, where the ovolo and talon immediately above and below it are enriched; as in the Corinthian cornice of the Pantheon, at Rome; and also in our magnificent Cathedral of Saint Paul, in the City of London. For where the dentils are marked, especially if they are minute, as in Palladio's Corinthian design, the three members are confounded together; and, being surcharged with ornaments, they become by far too rich for the residue of the composition, which are defects at all times studiously to be avoided; as a distinct outline, and an equal distribution of enrichments, must, on every occasion, strictly be attended to.

Scamozzi, who succeeded Palladio in all his chief employments at Vicenza, observes, with great truth, that ornaments should neither be too frugally employed, nor distributed with too much profusion; their value will increase in proportion to the judgement and discretion shown in their application. For, in effect, says he, the ornaments of sculpture, used in architecture, are like diamonds in a female dress, with which it would be absurd to cover the face or other principal parts, either in themselves beautiful, or appearing with greater propriety in their natural state.

Variety in ornaments ought not to be carried to an excess. In architecture they are only accessaries, and therefore they should not be too striking, nor capable of long detaining the attention from the main object. Those of the mouldings, in particular, should be simple, uniform, nor ever composed of more than two different representations upon each moulding: these ought to be cut equally deep, be formed of the same number of parts, and all nearly of the same

dimensions, in order to produce an even, calm, and uninterrupted, effect throughout: so that the eye may not be more strongly attracted by any particular part than by the entire composition.

When mouldings are of the same form and size in a profile, they should be enriched with ornaments of one kind: hence the figure of the profile will be better comprehended, and the architect will avoid the imputation of childish minuteness, neither much to his own credit, nor of any advantage to his works.

It must be remarked, that, all manner of ornaments appertaining to mouldings should be evenly and regularly disposed, corresponding perpendicularly above each other, as at the three columns in the Campo Vaccino, where the middles of the modillions, dentils, oves, or eggs, and other ornaments, are all in one perpendicular line. For nothing can be more careless, confused, and unsightly, than to divide them without any order, as they are in many examples of the antients, and in many buildings in London, where the middle of an ove, or egg, answers, in some instances, to the edge of the dentil, and in some to its middle, and in others to the interval. All the rest of the ornaments in the cornices of entablatures should be governed by the modillions, or mutules; and the distribution of these must depend on the intervals of the columns: and be so disposed that one of them may come directly over the centre of each of the columns.

It is further to be remarked, that the ornaments should partake of the character of the order they enrich. Those applied to the Doric and Ionic order should be of the simplest forms, and of larger sizes, than those employed in the Corinthian and Composite.

When friezes or other large compartments are required to be enriched, the ornaments should be appropriate and significant, and serve to indicate the use for which the building is intended, the rank, qualities, profession, as well as the achievements, of the proprietor: but it is a very silly practice to crowd almost every part with heraldic arms, crests, cyphers, and mottos: insignificant figures of such things are for the most part not only contemptible, but, generally speaking, very bad, or extremely vulgar; and their introduction betrays an unbecoming vanity in the proprietor of the fabric. Hogarth, says Chambers, pleasantly ridiculed this practice by decorating a nobleman's crutch with a coronet.

In sacred places, all manner of obscene, grotesque, and heathenish, representa-

tions ought to be avoided: for indecent fables, extravagant conceits, or instruments and symbols of Pagan worship, are ornaments grossly improper in structures consecrated to Christian devotion.

With regard to the execution of ornaments, it is to be remembered that, as in sculpture, drapery is not esteemed, unless its folds are contrived to grace and indicate the parts and gesticulations of the body it covers; so in architecture, the most delicate and classical ornaments lose all their value if they load, alter, or confuse, the forms they are intended to enrich and adorn.

All manner of ornaments, therefore, which appertain to mouldings, except such as are cast, should be cut into the solid, and never applied on the surface, as Davilier, a late architect, has most erroneously taught; because the latter method not only alters, but disfigures, the forms and proportions of the mouldings. The profiles, therefore, should be first finished plain, and afterwards enriched; the most prominent parts of the ornaments being made equal with the surfaces of the mouldings they adorn: and great care should be taken, in all such cases, that the angles, or breaks, are kept perfect and untouched with sculpture; and from this reason it is usual, at the angles of all manner of enriched mouldings, to place water-leaves or other plain leaves, the centre filaments of which form the angles, and keep the outlines entire.

One of the most delightful examples, in verification of the before-mentioned principle, says Mr. Gwilt, is the capital of the order, used in the circular temple at Tivoli, in which the leaves, instead of being *aplique* to the bell of the capital, are absolutely cut out of it; the effect of which, says the same author, "*is wonderful as well as pleasing*." We have been favoured with an exact copy of the capital adverted to, as measured by an artist upon the spot, and have great pleasure in presenting it to our readers, who may rely upon it as a correct representation, it being copied from an original, which has been subsequently introduced in the exterior elevation of the Bank of England, by the classical architect of that national and splendid structure.

The method of the antient sculptors, in the execution of architectonic ornaments, was to aim at a perfect representation of the object they chose to imitate; so that the chesnuts, acorns, and oves, or eggs, with which the ovolo is commonly enriched, are in the antient, as well as in modern, examples cut round and almost entirely detached; as are, likewise, the berries, or beads, on the astragal, which

are generally as much hollowed into the solid of the bodies as the mouldings which project beyond them; but the leaves, shells, and flowers, which are usually introduced to decorate the cavetto, cyma, talon, and torus, are kept flat, in imitation of the things which they represent.

The antients, in the application of their ornaments, were very choice in the selection of such as required considerable relief. On mouldings, that in themselves are clumsy, such as the ovolo and astragal, they made deep incisions to produce their enrichments, by which they acquired an extraordinary lightness: but, on more elegant parts, such as the cavetto and cyma, they employed the representation of very thin bodies, such as leaves, which could be represented without entering too far into the solid. The ornaments in the cornices of the antients were boldly marked, that they might be distinguished from afar; but those of the bases of columns, or of pedestals, being nearer the eye, were more slightly expressed; as well on that account, as because it would have been very improper to weaken those parts, and utterly impossible to keep them clean, had there been any deep cavities in them to harbour dust and filth.

When objects are very near, and liable to close inspection, every part of the ornaments, both great and small, should be forcibly expressed and well-finished: but, when they are much elevated, the minutiæ or detail may be slightly touched only, or entirely neglected; for it is quite sufficient if the general form be distinct, and the principal or more prominent masses strongly marked. A few rough strokes, from the hand of a skilful master, are much more effectual than the most elaborate finishings of a cold and artless imitator, which seldom consists of more than smoothing and neatly rounding-off the parts, and are more calculated to destroy, than to produce, effect.

Nature is the supreme and true model of the imitative arts; from a contemplation of her beauties every great artist must form his idea of the profession in which he means, and is determined, to excel: the works of the antients are, to the architect, what nature is to the painter or sculptor; the source from which his chief knowledge must be collected; the models by which his taste must be formed. But, even in nature, few things are faultless, and it must not be imagined that every antient production in architecture, though Grecian or Roman, is perfect and fit for imitation. On the contrary, the remains of the antients are so extremely unequal, that it requires the greatest discrimination and circum-

spection and effort of judgement to make a proper choice. The Grecian and Roman arts, like those of other nations, have had their rise, their æra of perfection, their decline. At Athens, at Rome, as in London and Paris, and elsewhere, there have been but very few great architects, but many very indifferent ones; and the Romans and Grecians had their connoisseurs, as we have ours, who would sometimes dictate to the architect and cramp the fortunate sallies of his genius; force upon him, and upon the world, their own whimsical productions; promote ignorant flatterers; discourage, and even oppress, honest merit.

Vitruvius, who lived in the Augustan age, complains loudly of this hardship: and there is a remarkable instance of the vindictive spirit of an antient connoisseur in Adrian, who put to death the celebrated Apollodorus, for having ventured a sarcastic remark upon a temple designed by that emperor, and built under his direction.

In the constructive part of architecture, the antients do not seem to have been great proficients; and we are inclined to believe, with the most learned authors, that many of the deformities observable in the Grecian buildings must be ascribed to their deficiency in the art of construction. Neither does it appear that the Romans were much more skilful; the precepts by Vitruvius are very imperfect and ambiguous upon the subject, and sometimes extremely erroneous; and it is highly probable that the strength or duration of their structures is more owing to the quantity and goodness of their materials, than to any scientific principle of putting them together: we must not, therefore, expect from any of the antient works much information on the executive branch of the art.

Michael Angelo, who, skilled as he was in mathematical knowledge, could have no very high opinion of the antient mode of construction, boasted that he would suspend the largest temple of antiquity, meaning the Pantheon, in the air; this he afterwards verified in the cupola of Saint Peter's, at Rome: and Sir Christopher Wren, with not less ability, conducted all parts of Saint Paul's, and many others, his numerous admirable works, with so much ingenuity and art, that they are, and ever will be, studied and admired by all intelligent observers. To him, and several ingenious artists and artificers since his time, we owe many great improvements in carpentry, which has been, in late years, still further improved by the indefatigable labours of Mr. Peter Nicholson, upon whose scientific principles the British nation has established, and carried to the highest perfection, every thing which is interesting, instructive, and useful, in the art of building;

THEORY OF MOULDINGS, &c.

AND THE ANCIENT METHOD OF SWELLING THE SHAFTS OF COLUMNS.

London, Published by Thos. Kelly, 17, Paternoster Row Jany. 1 1827.

THE FIVE ANTIENT ORDERS OF ROMAN ARCHITECTURE.

but particularly in carpentry and joinery, to which the veteran author has for years devoted himself, to the benefit of his fellow-subjects; nor is the public less indebted to other ingenious men.

Some of the French architects have also evinced considerable science in the constructive art; in the mason's particularly, which has been considerably improved by that nation; and we are likewise indebted to the French, to the Italians, and to a few of our own countrymen, for many valuable books, in which the manner of conducting great works is copiously explained.

From such works, composed on a principle similar to that now under perusal, the architect may collect the rudiments of construction; but, it is to be remembered that practice, experience, and attentive observation, are essentially requisite to render him properly skilled in this important branch of his profession.

REFERENCES TO THE PLATES ON THE PRECEDING THEORY OF THE FIVE ORDERS.

ORDERS, PLATE I.—*Fig.* 1 represents two methods, in a joint diagram, of producing graceful or pleasing contours to the shafts of columns, by Vignola and Nicomedes, which are fully described in reference to this plate in the body of the work.

Fig. 2 elucidates also, by an optical diagram, the theory on the diminution of columns, likewise adverted to, subsequent to the former, in the letter-press.

Figures 3, 4, 5, 6, 7, 8, 9, and 10, represent the different Roman mouldings, used in the combination of bases, capitals, and entablatures, with the method of drawing them, and the names attached to each.

Fig. 11 represents the outline of the Doric order, with lettered references to the respective mouldings, so that the student may refer to the names of each, and thus become familiar with the science.

Fig. 12 exhibits the entablature and capital of the Grecian Doric order, as built in the Temple of Theseus, at Athens, showing the trigliphs at the angles, and the architrave overhanging the upper diameter of the column.

ORDERS, PLATE II. represents the five antient orders of Roman architecture; elucidating, at one view, their general proportions, with their names, and graduated according to their rank, as they should be carried into effect, that is, in proportion to their bulk, and in reference also to the preceding theory and subsequent principles on practice.

Orders, Plate III.—This plate represents the three Grecian orders, known by the names of Doric, Ionic, and Corinthian, which are introduced for the purpose of elucidating the difference in the style of the Roman and Grecian architects, in the carrying these orders into effect.

We now proceed to the Practice of the Five Orders, commencing with the Tuscan.

PRACTICE OF THE TUSCAN ORDER.

Among the remains of antiquity, there are not any of a regular *Tuscan Order*, but a most admirable specimen of a Tuscan column exists in the Trajan pillar, at Rome. The doctrine of Vitruvius upon the subject of the Tuscan order is extremely obscure, and the profiles of Palladio's disciples are all more or less imperfect.

In the design here introduced, *(Plate* IV,*)* Vignola has been imitated. Even Inigo Jones, who was so close an adherer to Palladio, has employed Vignola's profile in York Stairs, London, and in other designs of public and private edifices. But, as the cornice adopted by Inigo Jones appears to have been, in the opinion of the best writers, inferior to the rest of his Tuscan compositions, it has been rejected, and the profile of Scamozzi introduced, with such alterations as have been considered necessary to render it perfect, and conformable to the doctrine of Vitruvius, as well as to the general practice of the moderns.

The height given to the column is fourteen modules, or seven diameters; and to that of the entire entablature, three and a half modules; which, being divided into ten equal parts, three of them are given to the height of the architrave, three to the frieze, and the remaining four to the cornice.

The capital is in height one module; the base, including the lower cincture of the shaft, is also one module; and the shaft, with its upper cincture, twelve modules.

These are the general measures of the Tuscan order, and may be easily remembered.

With regard to the particular dimensions of the minuter parts, they may be collected from the engraving, *Orders, Plate* IV, whereon the heights and projec-

THE THREE ANCIENT ORDERS OF GRECIAN ARCHITECTURE.

tions of each member are minutely figured, the latter of these being counted from perpendiculars raised at the extremities of the inferior and superior diameters of the shaft: a method which has been deemed universally preferable to that of Desgotez, and others, who count from the centre of the column, because the relations between the heights and projections of the parts are more readily discoverable; and, wherever a cornice or entablature is to be executed without a column, which very frequently happens, it does not require any additional time or labour, as the trouble of deducting, from each dimension, the semi-diameter of the column, is saved.

Scamozzi, that his bases might be of the same height in all the orders, has given to the Tuscan, exclusive of the cincture, half a diameter: but, in the example here introduced from Chambers, Vignola and Palladio have been imitated. The latter, in this order, have deviated from the general rule; for, as the Tuscan base is composed of two members only, instead of six, which constitute the other bases, it becomes much too clumsy when the same general proportion is scrupulously followed.

The Tuscan order will not admit of ornaments of any kind; on the contrary, it is sometimes customary to represent, in the shaft of its column, rustic cinctures, as at the Luxembourg, in Paris; at York-Stairs and Somerset-House, in London; and in many other buildings of considerable note. This practice, though frequent, and to be found in many of the works of distinguished architects, is not always excusable, and should be indulged with great caution, as it helps to hide the robust characteristic and truly rustic but manly figure of the column, it alters the proportions, and at once affects the simplicity of the entire composition. Few examples are to be found of these bandages in the remains of antiquity; and, in general, it will be adviseable to avoid them in all large designs; reserving the rustic work for the intercolumniations, where it may be employed with great propriety so as to produce a contrast, which will help to render the aspect of the entire composition perfect, distinct, and striking.

But, in smaller works, where the parts are few, and easily comprehended, rustic cinctures may be sometimes introduced and sanctioned, and oftentimes recommended; as they serve to diversify the forms, produce strong and impressive contrasts, and contribute most essentially to the masculine, bold, and imposing, effect of the composition.

The most eminent of the antient, as well as modern, architects have recommended the Tuscan order to be introduced in the exterior gateways to citadels, arsenals, and prisons, of which the entrances should be terrific; and the order is also fit for designs of gates to gardens or parks, and for grottos, fountains, and baths, where elegance of form and delicacy of workmanship would be inconsistent and out of character. Delorme, the French architect, was extremely fond of cinctures, which are square blocks, introduced at intervals in the heights of the shafts of columns, and he employed them in several parts of the Thuilleries, covered with arms, cyphers, and other enrichments: but this seems very absurd, for they never can be considered in any other light than as parts, which, to avoid expense and trouble, were left unfinished. In different parts of the Louvre, wormy or vermiculated rustics are to be found, of which the tracts represent flowers de luce, and other regular figures and devices; this is a practice far more unnatural than the preceding, though Monsieur Davilier states that it may be done with great propriety, and signify a relation to the owner of the structure; that is, says he, the figures should represent the arms, the crest, motto, cypher, and all the rest; as if worms were draughtsmen, and understood whatever appertained to heraldry.*

The most beautiful specimen of the Tuscan order, in London, is the portico of St. Paul's Church, Covent-Garden; the effect of which is truly sublime: it was designed by, and executed under the inspection of, Inigo Jones,† who frankly told the

* Davilier was born in 1653; died in 1700. He was a native of Paris, was elected by the French Academy one of their travelling students at an early age, and took his departure from Marseilles with Desgotez and the celebrated Vaillant. The ship in which they sailed was captured by the Corsairs, and carried into Algiers. His captivity lasted seventeen months, during which time he designed and executed a mosque, at Tunis, for the barbarians. Besides the work above-mentioned, he translated Scamozzi.

† This justly celebrated English architect was the son of Ignatius Jones, a cloth-worker, and was born in the vicinity of Saint Paul's, about 1572. He is said to have been apprenticed to a carpenter and joiner, but that he remained long in such fetters is not probable, from the circumstance of his early skill in landscape painting, of which a specimen is, we believe, still to be seen in Chiswick-House. Under the patronage either of the Earl of Arundel or the Earl of Pembroke he visited Italy, and spent much of his time in Venice. From Venice he passed into Denmark, on the invitation of Christian IV. In 1606 he returned to his native country, in the suite of the King of Denmark, whose sister James the First had married. Mr. Seward observes, that the first of his works in England was the interior of the church of Saint Catherine Cree, in Leadenhall Street. Soon after his arrival he was appointed architect to the queen, and was also in the service of Prince Henry: to these he gave so much satisfaction, that the king granted him the reversion of surveyor-general. On the death of Prince Henry, in 1612, Jones visited Italy a second time, where he remained until the office just mentioned fell to him. His liberality and disinterestedness on this occasion

parishioners, previous to the commencement of the undertaking, that their funds were not equal to the expenses of building a magnificent parish church, but that he would design and execute, for the same purpose, the handsomest *barn* in his Majesty's dominions, which was presently verified; and perhaps, in the metropolis, we have not a more harmoniously proportioned room, nor one better calculated for divine service: that is, with regard to hearing and seeing the officiating minister; and with respect to the exterior effect, it cannot be equalled for its simplicity and grandeur.

The various designs for gates, doors, and windows, which have been published by the most distinguished architects, afford numerous figures of rustic columns, and other sorts of rustic work; most of which have been collected from buildings of considerable note in different parts of Europe; but for the manner of executing them, as it cannot well be described, the student is referred to various parts of the new buildings at Somerset-House, in the Strand, to the Horse-Guards, the Treasury, the Doric entrance of the King's-Mews, Charing-Cross, the gate of Burlington-House in Piccadilly, the fronts of Newgate and Giltspur-Street Prisons, the Excise-Office in Broad-Street, and to numerous other buildings in and near the metropolis.

Sir William Chambers says, that De Chambrai, in the introduction to his "*Parallels of Antient and Modern Architecture*," treats the Tuscan order with

deserve to be recorded. Finding the office greatly in debt, he not only served without pay till the embarrasments were removed, but prevailed upon his fellow officers to do the like, by which expedient the debt was soon cleared. He wrote, by the desire of the king, an account of Stonehenge, in 1620, in which year he was appointed one of the commissioners for repairing *old* St. Paul's Cathedral, in London. On the death of James, he was continued in his situation by Charles I, for whom he executed the banqueting-house, barely the fiftieth part of the then proposed palace at Whitehall, the designs for which had been made in the previous reign. In June, 1633, the order was issued for the reparation of St. Paul's; on which Jones was immediately afterwards employed. During the reign of Charles I, he gave many proofs of his genius and fancy, in the machinery and designs for scenic representations, &c. He died in 1652, and was interred in the chancel of St. Bennet's, Pauls' Wharf, London. His works are too well known to require an enumeration. It is here sufficient to say, that he was the FATHER of PURE ARCHITECTURE in GREAT BRITAIN. Representations of many of his buildings may be seen in Campbell's '*Vitruvius Britannicus*.' His principal designs were published by Kent, folio, 1727; some of his lesser designs, folio, 1744; and others were also published by Mr. Ware. The Water-front of Old Somerset-House has lately been copied in the erection of a very conspicuous Fire-Office, near the Quadrant, in the new street of the metropolis; the adoption of which is a strong proof of the architect's good sense and discrimination. Inigo Jones left a copy of Palladio, the Venice edition of 1601, with notes on the margin, in his own hand-writing: he seems to have carried this copy about with him on his travels, from the notes being dated. The book, says Mr. Gwilt, which has been badly preserved, is in the library of Worcester College, Oxford, where it may still be seen.

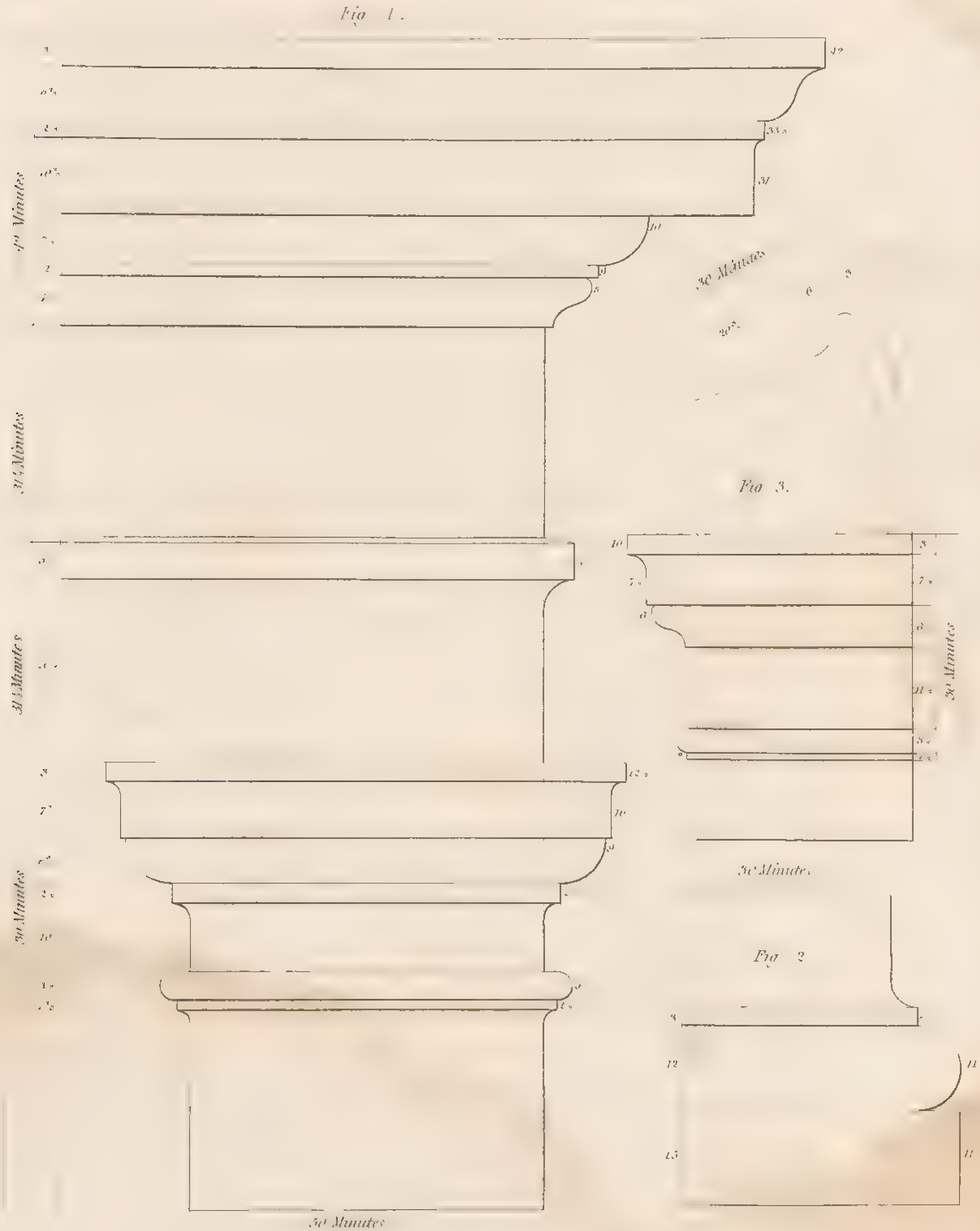
great contempt, and banishes it to the country, as unfit and unworthy to have a place, either in temples or palaces; but, in the second part of the same work, he is more kind and indulgent; for, though he rejects the entablature, the column is taken into favour, "and compared to a queen seated on a throne, surrounded with all the treasures of fame, and distributing honours to her minions, while other columns seem only to be servants and slaves of the buildings they support."

The residue of the passage is too long to be inserted, but it is calculated to degrade, and totally to exclude, the Tuscan order: yet, by a different mode of employing and dressing the *column,* to exalt its consequence, and increase its majesty and beauty, so as to stand an advantageous comparison with any of the rest; he, therefore, wishes, in imitation of antient architects, to consecrate the Tuscan column to the commemoration of great men and their glorious actions; noticing, as we have done, the Trajan column, one of the proudest monuments of Roman splendour, and consisting of the base, shaft, and capital, of the Tuscan order. This column was erected by the senate and people of Rome, in acknowledgement of the services of Trajan, and has contributed more to immortalize that emperor than the united efforts of all historians.

De Chambrai also notices the Antonine column, erected at Rome, on a similar occasion, in honour of *Antonius Pius;* and another, of the same sort, at Constantinople, raised to the emperor Theodosius, after his victory over the Scythians: both which prove, by their resemblance to the Trajan column, that this sort of appropriation, recommended by him, had passed into a rule among the antient masters of the art.

We shall not here dispute the accuracy, justness, or fitness, of De Chambrai's observations; but may venture to affirm that, not only the Tuscan *column,* but the *entire of the order,* as represented in this work, after Sir William Chambers, (which, in fact, is the production of Vignola and Scamozzi,) may be praised and extolled as extremely beautiful; and, in numerous instances, may be usefully applied: besides, as an order, it is a necessary gradation in the art; and, although not recognized by the Grecian architects, for its purposes it is not inferior to any of the antient orders: for it conveys, not only ideas of strength and rustic simplicity, but is very proper for rural purposes, and may, with great propriety, be employed in farm-houses, in barns, and sheds for implements of husbandry, in stables, coach-houses, dog-kennels, in green-houses, grottos, and fountains; in

PARTS OF THE TUSCAN ORDER.



Drawn by M. A. Nicholson
Engraved by W. Symns
London Published by Thos Kelly, 17 Paternoster Row, October 9, 1824.

gates of parks and gardens, and, generally, whenever magnificence is not required and expense is to be avoided. Serlio recommends the use of it in prisons, arsenals, public granaries, treasuries, sea-ports, and gates of fortified places; and Le Clerc observes that, although the Tuscan order is treated by Vitruvius, by Palladio, and by many others, with great contempt, as unworthy of being identified; yet, according to the composition of Vignola, there is a beauty in its simplicity which recommends it to notice, and entitles it to a place both in private and public buildings, as in porticos and colonnades surrounding squares or markets, in granaries and storehouses; even in royal palaces, if suitably introduced to adorn the inferior apartments, offices, stables, and other places, where strength and simplicity are required, and where richer or more delicate orders would be extremely improper.

In accordance with the theory and practice which have been explained, seven diameters, or fourteen modules, have been appropriated to the height of the Tuscan column; a proportion extremely proper for rural and military works, where the appearance of extraordinary solidity is required: but, in town-houses and other buildings, intended for civil purposes, or in reference to interior decorations, the heights of the columns may be fourteen and a half, or even fifteen, modules, as Scamozzi has made them; which increase may be entirely in the shaft, without altering any of the measures, either of the base or capital. Nor will it be requisite to alter the entablature; for, as it is composed of few parts, it will be sufficiently bold, although its height be somewhat less than one-quarter of the height of the column.

REFERENCES TO THE PLATE ON THE PRACTICE OF THE TUSCAN ORDER.

Orders, Plate IV.—*Fig.* 1 represents the entablature and capital, on a large scale, wherein the heights and projections of the several members are proportioned, as described in the theoretical and practical references.

Fig. 2 shews the base, one half of the size of the column annexed.

Fig. 3 describes the proper impost and archivolt to this order, under the idea of their being employed in arcades or gateways, which is very frequently the case.

PRACTICE OF THE DORIC ORDER.

The Monument on Fish-Street Hill, erected to commemorate one of the most dire calamities that ever befel the inhabitants of this great city, is considered the proudest example of a Roman Doric column in the British dominions. It was designed and constructed by Sir Christopher Wren. The lower diameter of the column is fifteen feet, and the altitude of the shaft is in proportion: this, with the historical pedestal, and the attic at the top, emblematical of the great fire, is upwards of 200 feet in height.

In order to contemplate the beautiful and philosophical proportions of the Roman Doric *column*, as connected with its *entablature*, which is a component part of the order, it will be requisite that the student should turn his attention and thoughts to those examples which have been designed and executed under the greatest masters, both antient and modern.

It has been the practice, of late years, to introduce, as a substitute for the Roman Doric and Tuscan pillars, the Grecian Doric column; especially in monuments intended to commemorate the achievements of valorous men; but among those which have been carried into effect, during our time, in various parts of the kingdom, it is but honest to remark, that they are as inferior, in point of effect, to the Doric Monument in London, as the minor churches of the metropolis are to the sublime cathedral dedicated to Saint Paul.

The Grecian Doric column, elevated upon a pedestal, is entirely at variance with the practice of the Grecian architects; who, in all the Temples of antiquity, have placed their columns upon a series of lofty gradated risers, proportioned or suited to the circumstances of the case: and, where this practice has not been adopted, the Grecian Doric column, which is peculiar for its beauty, and singular in its effect, has been sacrificed for the want of judgement.

The height of the Roman Doric column, including its capital and base, is sixteen modules; and the height of the entablature four modules: the latter, being divided into eight parts, two of these parts are allowed to the architrave, three to the frieze, and the remaining three to the cornice.

In most of the antiques, the Doric column is found to have been executed without a base; this is particularly observable in examining the remains of Grecian examples. Vitruvius, likewise, makes it without one; the base, according to that author, having been first employed in the Ionic order, to imitate the sandal or covering of a woman's foot. Scamozzi blames this practice, and most of the moderns have been of his opinion; the greatest part of them having employed the attic base in this order. Monsieur De Cambrai, however, whose blind attachment to the antique is, on many occasions, sufficiently evident, argues strongly against this practice, under the idea that the order is formed upon the model of a strong man, who is constantly represented barefooted; and, according to the notions of this author, the practice of introducing a base to the Doric column is very improper; and "though," says he, "the custom of employing a base, in contempt of all antient authority, has by unaccountable and false notions of beauty prevailed," yet we are of opinion, with Chambers, that the intelligent eye, when apprized of the error, will be easily undeceived; and as what is merely plausible will, when examined, appear to be false, so will apparent beauties, when not founded in reason, be deemed extravagant.

Le Clerc says that, in the most antient monuments of this order, the columns are without bases, for which it is difficult to assign any satisfactory reason: but De Cambrai, in his parallel, is of the same opinion with Vitruvius, and insists that the Doric column, being composed upon the model of a naked, strong, and muscular, man, resembling Hercules, should not have any base; thus affecting that the base to a column is the same as a shoe to a man. This doctrine may have prevailed in former times; but, at the present, it is too inconsistent and childish to be adopted: for we cannot consider a column destitute of a base, in comparing it to a man, without being, at the same time, struck with the idea of a person without feet, rather than without shoes: hence we are inclinable to believe, either that the architects of antiquity had not yet thought of employing bases to their columns, or that they omitted them in order to leave the pavement clear; the angles and projections of bases being stumbling blocks to passengers, and so much the more troublesome, as the architects of those times frequently placed their columns very near each other; so that, had they been made with bases, the passages between them would have been extremely narrow and inconvenient. There can be no doubt that it was from this reason that Vitruvius made the plinth of his Tuscan

column round: the latter order being, according to his precepts, especially adapted to servile and commercial purposes, where convenience should always give way to beauty. But, whatever may be the opinion of the vulgar, it is presumed that men of good taste will allow that, in most cases, a well-proportioned graceful base is very handsome; and not only so, but also of real utility, serving to keep the column firm in its place; and that, if columns without bases are entirely set aside, it will be a mark of wisdom in architects rather than an indication of their being swayed by prejudice, as some blind adorers of the antients would insinuate.

The latter are the sentiments of Sir William Chambers, who had a rooted aversion to every thing which was Grecian: nevertheless, it must be granted that he was, take him "all in all," a man of considerable judgement, and reasoned well upon his art. In imitation of Palladio, and all the modern architects, except Vignola, he has made use of the attic base in this order; which base certainly is the most beautiful of any. Yet, for the sake of variety, when the Doric and Ionic orders are employed together, the base invented by Vignola should be adopted, as shewn in the Doric Order, *Plate* II. This base Bernini has employed in the colonnade of Saint Peter's, at Rome; and it has also been very successfully applied in many other buildings.

Vitruvius gives to the height of the Doric capital one module; and all the moderns, except Alberti, have followed his example. Nevertheless, as the capital is of the same kind with the Tuscan, they should be nearly of the same proportion, in reference to the heights of their respective columns; and, under these circumstances, the Doric capital should be more than one module; which, indeed, it is, both at the Coliseum and the Theatre of Marcellus, at Rome; being in the first of these buildings upwards of thirty-eight minutes, and in the latter thirty-three minutes, high.

In the design, *Orders, Plate* V, the example adverted to after Sir William Chambers, the height of the entire capital is thirty-two minutes; and, in the form and dimensions of the several members, it seems that he deviated but little from the Theatre of Marcellus, at Rome. The frieze or neck of the capital is enriched with husks and roses, as in Palladio's design, and as it has been executed by Sangallo at the Farnese Palace.* The projections of the husks and flowers should not exceed the upper cincture of the column.

* Sangallo was one of the architects employed in building St. Peter's, at Rome.

The architrave is only one module in height, and is composed of one fascia and a fillet, as at the Theatre of Marcellus. The drops in this, the Roman Doric, are conical, as they are in most of the Roman buildings; and not pyramidal, as they are generally executed by our English artisans. They are presumed, says Chambers, to represent drops of water that have trickled from the trigliphs; and, consequently, they should be cones, or parts of cones, and not pyramids; but the Grecian architects, who were better versed in the minutiæ and details of architecture, thought very differently, and made these drops portions of cylinders, the plan being rather more than a semi-circle, and those in the soffits of the mutules perfectly round; and, instead of being inserted in the solid of the mutules, they are described, in the Grecian Doric, as so many pendents; which, in execution and in effect, is infinitely superior to the cold Roman style of finishing the same parts.

The Doric frieze and cornice by Sir William Chambers, as given in this work, are, each of them, one module and a half in height, the metope is square, and enriched with a bull's skull, decorated with garlands of beads, in imitation of those in the Temple of Jupiter Tonans.

In some antient fragments, and in a large portion of our modern edifices, the metopes between the trigliphs are alternately ornamented with ox-skulls and with patteras; but they may, with great propriety, be filled with any other ornaments of suitable forms, and frequently with such as are appropriate to the buildings they decorate. For example: in military structures, the head of Medusa, or the Furies, thunderbolts, and other symbols of horror, may be correctly introduced: also helmets, daggers, garlands of laurel or oak, and crowns of various sorts, such as those used among the Romans, and presented as rewards for various military achievements: but spears, swords, quivers, bows, cuirasses, shields, and the like, should be avoided; because the actual dimensions of these instruments are too great to find admittance in such limited spaces as the compartments adverted to, and as diminutive representations always convey ideas of triviality, they should, consequently, be wholely avoided. In our churches, dedicated to the saints, and set apart for Christian worship, cherubs, chalices, and garlands of palm or olive, may be introduced; likewise doves, and other symbols of moral virtues. In private houses, crests or marks of dignity conferred, may, on some occasions, be permitted; but seldom, and indeed never, where they are of such stiff insipid

forms as stars and garters, modern crowns, coronets, mitres, and similar graceless objects, the tasteless effects of which may be seen at the Treasury, in St. James's Park, and on various other buildings in the metropolis.

Among all the entablatures of the Five Orders, the Doric is the most difficult to distribute: that is, on account of the intervals between the centres of the trigliphs, which will not admit of being increased or decreased, without materially injuring the symmetry and characteristic beauty of the composition: and hence it is that the composer must be fettered by intercolumniations, devisable by two modules and a half, or of 250 minutes from centre to centre, which entirely excludes coupled columns, and produces spaces which, in general, are either too wide or too narrow for the purpose; and, to remove these difficulties, the trigliphs have been often omitted and the entablature made plain, as at the Coliseum in Rome, at the Custom-House in Dublin, and in many other magnificent buildings, not only in this country, but abroad. It is an easy expedient; but, at the same time, it deprives the order of its principal and primitive characteristic, and leaves it very poor and so much impoverished, as to be very little, if at all, superior to the Tuscan order; the remedy therefore seems desperate, and ought never to be adopted but in extreme cases, as the very last resource.

Chambers says that the antients employed the Doric order in temples dedicated to Minerva, to Mars, and to Hercules, whose grave and manly dispositions suited well with the character of the order: and Serlio says, it is proper for churches dedicated to Christ, to Saint Paul, Saint Peter, or any other saints, remarkable for their fortitude, in exposing their lives and suffering for the Christian faith: and Le Clerc recommends the adoption of it, in all sorts of military buildings, in the entrances to cities, arsenals, gates of fortified places, guard-rooms, and in all manner of similar edifices. It may also be employed in private houses; and, in particular, in the dwelling-houses of generals or other martial men: it may likewise be introduced in mausoleums erected to their memory, or in triumphal bridges and arches built to celebrate their victories.

The height of the Roman Doric column herein referred to is sixteen modules; which in buildings where majesty and grandeur is required, is a suitable proportion; but in an infinity of other instances it may be made more delicate. Vitruvius makes the Doric column in porticos loftier by half a diameter than in temples, and many of the modern architects have followed his example. In private

houses, therefore, it may be $16\frac{1}{3}$, $16\frac{1}{2}$, or $16\frac{2}{3}$, modules high: and for interior decorations even 17 modules, and sometimes perhaps a little more, which increase in the height may be carried entirely to the shaft, as described in the Tuscan order, without altering, in the smallest degree, either the base or the capital. The entablature may also remain unaltered in all its parts, for what is good in the one case applies to the other.

The ROMAN DORIC ORDER stands second in the list of the Five Orders; but the Grecian Doric, from which the former emanates, stands first among the three Greek orders, and is the most antient of those so called in architecture, being evidently derived from the Egyptians, of which little doubt can be entertained by those who have examined that great national work at the British Museum, which was published under the auspices of Buonaparte, at the time he was identified as NAPOLEON LE GRANDE. The Temple of Minerva, at Athens, commonly called the *Parthenon*, is considered, by the most learned architects and philosophers, as the boldest specimen of Grecian architecture that ever was constructed; the style of this structure is now generally known to be what is termed the *Grecian Doric:* but, besides this magnificent temple, the beauties of which have been explored by Stuart and others, there are several temples and buildings of great interest, well worthy the consideration of the architectural student, connoisseur, and draughtsman; particularly the Ionic Temples of Erectheus, Minerva Polias, the small Temple on the river Ilissus, the Temple of the Winds, the Choragic Monument of Lysicrates, commonly called the Lantern of Demosthenes, as well as the Choragic Monuments of Trysallus and others; among some of the last-mentioned may be collected almost every thing which is great and good in Grecian architecture.

The numerous examples of Roman and Grecian ornaments, mouldings, bases, capitals, and cornices, given in this work, have been selected as specimens of the pure style; and are, therefore, recommended, with some degree of confidence, to the attentive consideration of our readers.

The manner of reducing the GRECIAN DORIC ORDER to practice, is defined in the representation of the plates; which, we hope, will facilitate the labours of those who are anxious to acquire so much practical information as will enable them to reduce the order to such proportions, as, under all circumstances, will be pleasing and agreeable.

REFERENCES TO THE SEVERAL PLATES EXPLANATORY OF THE DORIC ORDER.

ORDERS, PLATE V.—*Fig.* 1. The *entablature* and *capital* of the *Roman Doric Order*, on a large scale, wherein the heights and projections of the respective members are correctly proportioned by a scale of modules and minutes, as explained in the Theory of the Five Orders, and which method equally applies to the lower and upper diameters of all the Orders.

Fig. 2.—Elevation of half of the attic base, the most esteemed among the antient examples.

Fig. 3.—Plan of the soffit; exhibiting the various ornaments appropriate to the mutules and spaces between.

ORDERS, PLATE XI.—*Fig.* 1. *Grecian Doric Entablature*, accompanied with an imitation of one of the capitals of the columns in the Temple of Theseus.

Fig. 2.—Plan of the soffit in the last-mentioned entablature, showing the mutules, with the bells, or circular drops, appertaining thereto.

Fig. 3.—Plan of the angular triglyphs and the forms of the residue.

ORDERS, PLATE XII.—*Fig.* 1. *Grecian Doric Entablature*, showing part of a pediment imitated from the Temple of Minerva, at Athens; with one of the capitals and bases of the columns appertaining to that magnificent temple. A view of the above entablature and capital is also given, under the article of Perspective, in this work, by M. A. Nicholson.

Fig. 2.—Plan of the soffit, in the above entablature, showing the mutules, with the bells or circular drops.

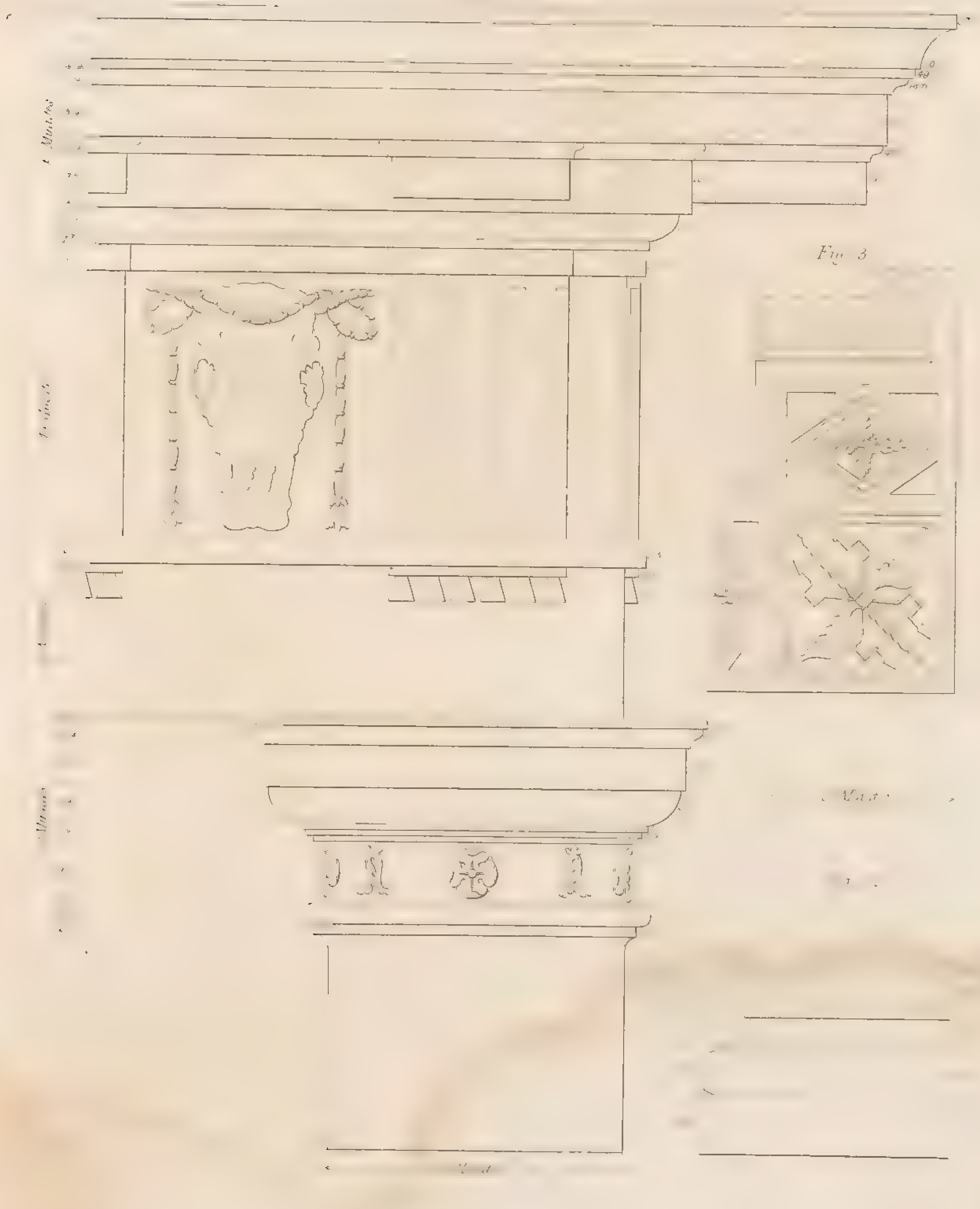
ORDERS, PLATE XIII.—*Fig.* 1. *Grecian Doric Entablature*, showing the application of the antæ at the angles of buildings.

Fig. 2.—The profile of the foregoing entablature and antæ.

ORDERS, PLATE XIV.—*Fig.* 1. *Grecian Entablature*, with antique wreaths; showing, also, the application of the antæ at the angles of buildings, and as executed in the Choragic Monument of Trysallus, at the foot of the Acropolis, or Citadel of Athens.

Fig. 2.—Profiles of the entablature and antæ, both of which are highly esteemed as Grecian examples, for their correct proportions, and decided effects when carried into execution.

ROMAN DORIC ORDER.



Published by Thos Kelly, 17 Paternoster Row, January 1, 1824.

GRECIAN DORIC ENTABLATURE & CAPITAL OF A COLUMN.

GRECIAN DORIC ORDER.

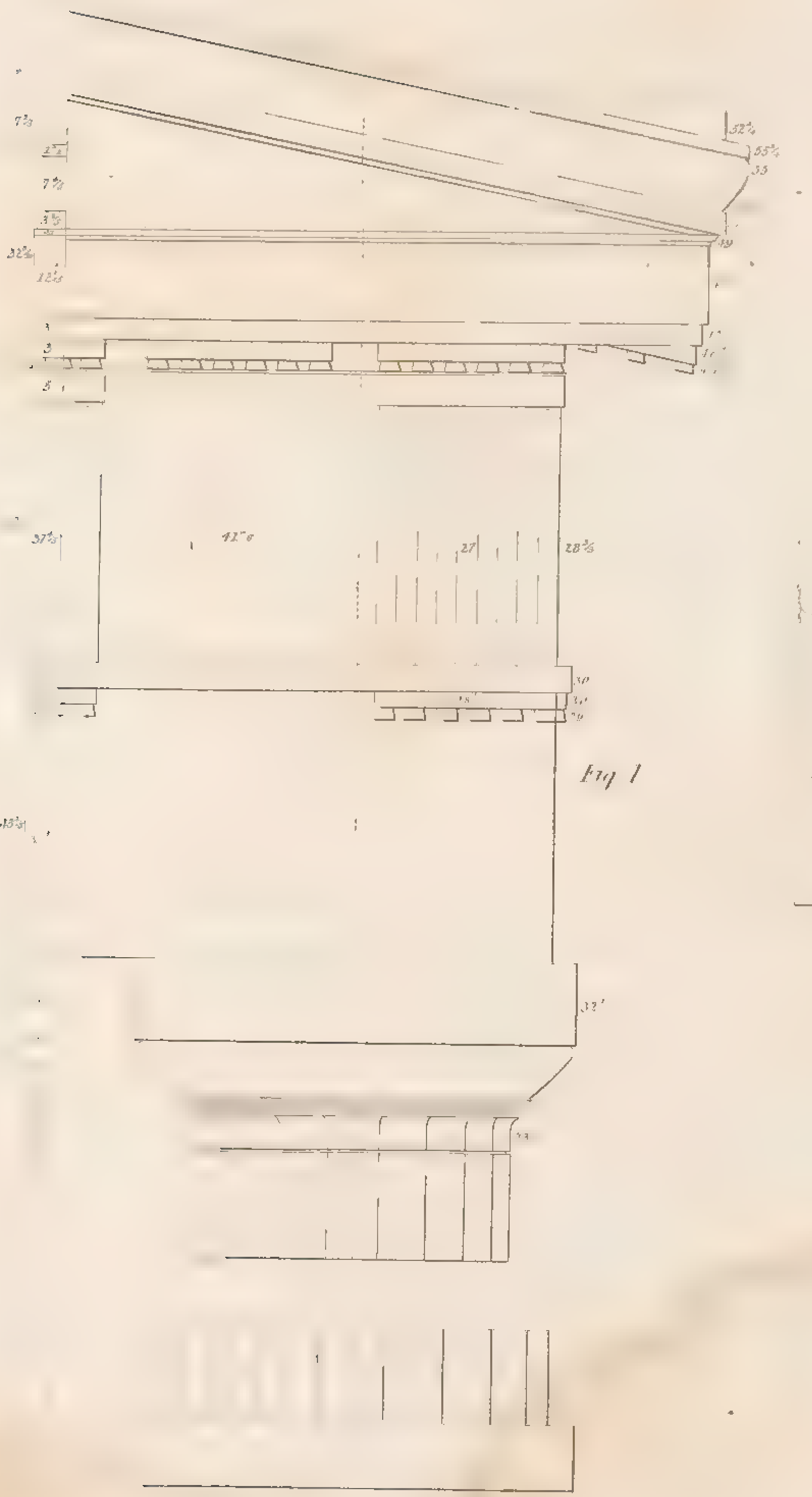


Fig. 1

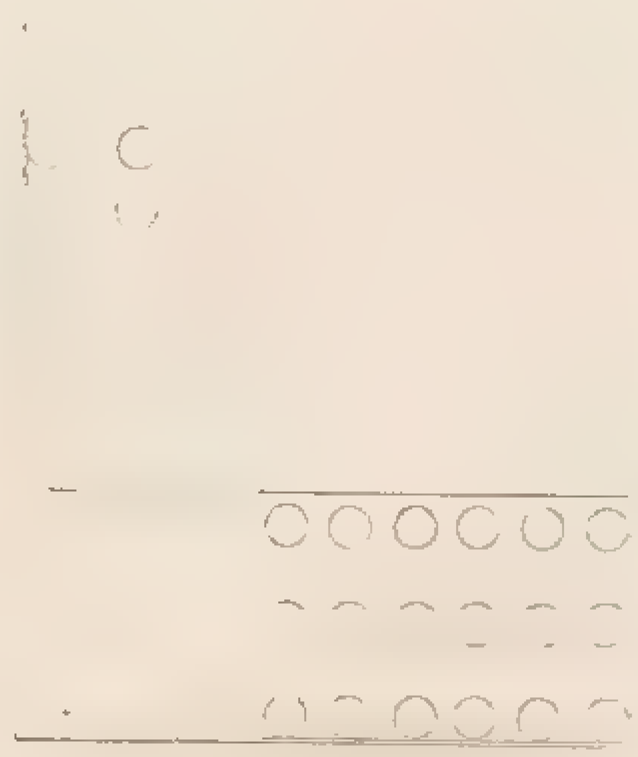


Fig. 2.

GRECIAN DORIC ENTABLATURE AND ANTÆ

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GRECIAN ENTABLATURE AND ANTÆ.

Fig 1.

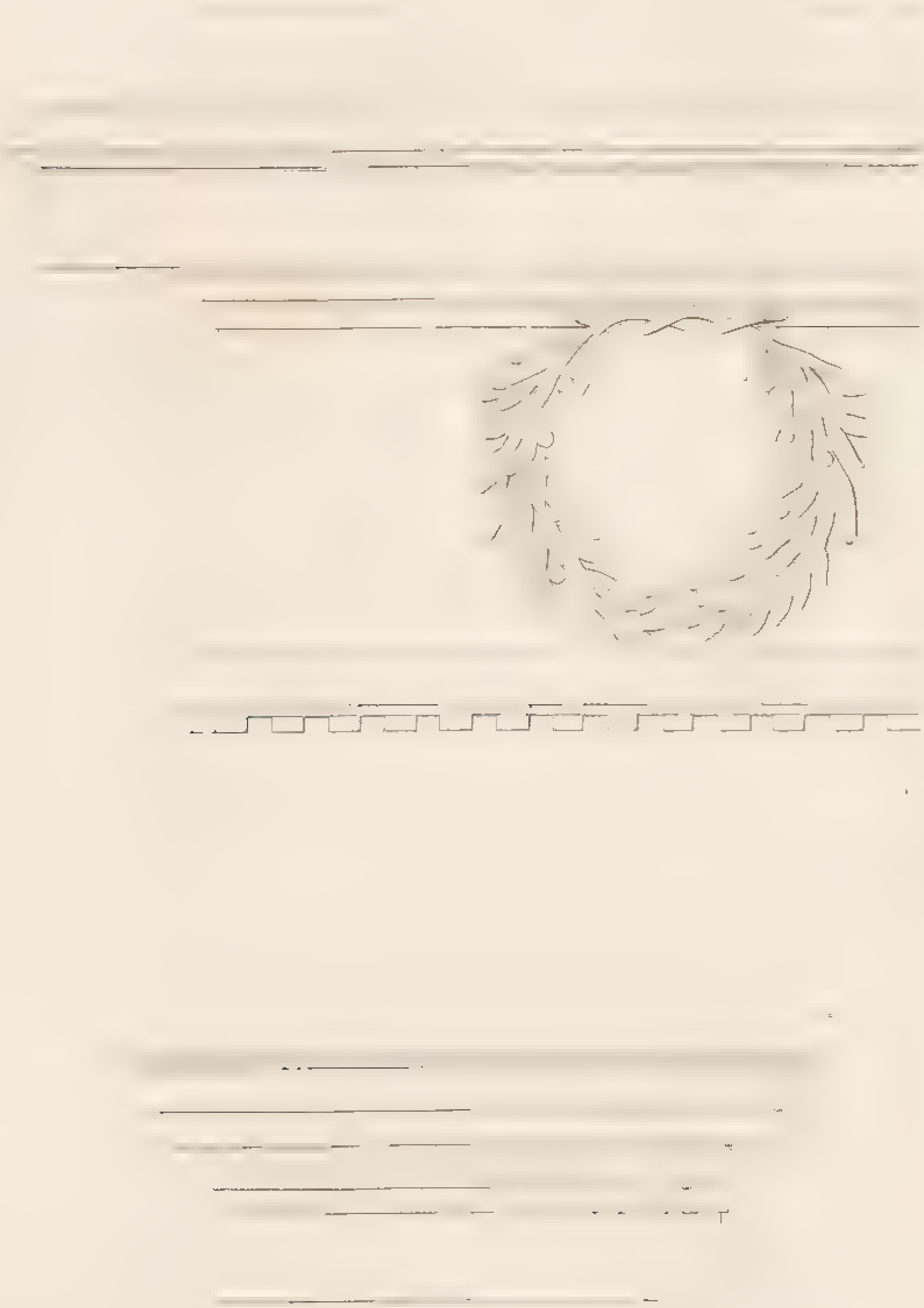


Fig 2.

PRACTICE OF THE IONIC ORDER.

This order is identified as the third in the list of the five antient orders of Roman architecture, and is proportioned by Sir William Chambers, as described in *Orders, Plate* II. The Ionic is the second, also, in the list of the three Grecian orders, as described in *Plate* III. It is necessary that the distinction should be made and well known, as there is a difference in the character of the Roman and Grecian Ionic, although both are recognized under the same general name.

The general proportions of the antient Ionic order, as adopted by the Grecian and Roman architects, are nearly alike; but the minutiæ and detail are very different; which will be presently discovered, by an attentive examination of the subsequent plates.

Among the antients, says Chambers, who always refers to the Roman architects, the form of the Ionic profile appears to have been more positively determined than that of any other; for, in all the antiques, the Temple of Concord excepted, it is exactly the same, and conformable to the description given by Vitruvius.

In *Plate* VI, of *Orders*, is represented the design of the antique profile, collected by Sir William Chambers, from different antiquities at Rome. The height of the column is eighteen modules, and that of the entablature four and a half, or one quarter of the height of the column, as in the other orders; which is a trifle less than in any of the antient examples. The base is attic, as it is in most of the Roman antiques, and the shaft of the column may be either plain or fluted, with twenty-four or twenty flutings only, as at the Temple of Fortune, the plan of which flutings should be a trifle more than semicircular, as in the Temple of Jupiter Tonans, and at the Forum of Nerva; because, when so executed, then they are more distinctly marked. The fillets, or intervals between the flutes, should not be much broader than one-third of their widths, nor narrower than one quarter.

The ornaments of the capital should correspond with the flutes of the shaft, and there should be an ove, or a dart, according to the strict rules of the Romans, over the middle of each flute: but, in the Roman Ionic volute, described in *Plate* IX, we have made some deviations from the general rule, and have introduced the contour and proportions of a Roman Ionic volute, which is considered as an improvement upon Goldman's and Delorme's method of describing the principal characteristic of this order. It is, therefore, deemed unnecessary to enter into further details upon the various opinions of different authors, on a subject which will be best comprehended and felt by a comparative view of the several diagrams for describing volutes.

The Roman volute is by some architects preferred; which will be apparent to the scientific observer on a cursory view of the magnificent street, now leading from Carlton-Palace up to Portland Place, in London. In the Ionic façade, opposite the same palace, the volutes of the capitals are Grecian, and are proportioned in the manner of those in the small temple on the River Ilissus, and as described in this work. This capital is justly esteemed; nor can it be sufficiently appreciated by those who entertain a true love for architecture. It is, therefore, surprising that the ingenious architects employed in the new street should, in any part of it, have adopted inferior specimens of the Roman Ionic capitals, as in the quadrangle, opposite the *façade* before-mentioned. In passing up the street, however, towards Portland Place, it is observable that, wherever the Ionic order has been subsequently introduced, improvements have taken place in the adoption and style of the Ionic capitals, except in the *finale* to the street, which presents to the eye of the inquisitive spectator a circular Ionic portico, terminated by a fluted conical spire of the same form; the metaphorical intention of which is not clearly understood, unless it is meant to convey, by a well-proportioned geometric figure, a new species of metaphysics, deducible, but which can be comprehended only by those who are deeply versed in mathematics. The effect of this spire is stated to be sublime; but what is not generally comprehended must be injudiciously applied; and, therefore, we lament that a magnificent street, so justly distinguished for its picturesque and architectural beauties, should be terminated by a conical *finial*, in no respect correspondent with the bold and intelligent metaphors usually applied by the Genius of Architecture.

The three parts of the Ionic entablature, as represented in *Plate* VI, of *Orders*, bear the same proportion to each other in this as in the Tuscan order: the frieze is plain, as being the most suitable to the simplicity of the rest of the composition; and the cornice is almost an exact copy from Vignola's design, in which there is a purity of form, a grandeur of style, and close conformity to the most approved specimens of the antients, not to be equalled in any of the profiles of his competitors.

If it be requisite to reduce the Ionic entablature to two-ninths of the height of the column, which on most occasions is preferable to that of one quarter, especially where the eye has been accustomed to contemplate diminutive objects, it may be easily accomplished by making the module of the entablature less, by one-ninth, than the semi-diameter of the column; afterwards dividing it as usual, and strictly observing the same dimensions as are figured in the engraved plate VI. The distribution of the dentil-band will, in such case, answer very nearly in all the regular intercolumniations, and in the extreme angle there will be a dentil, as there is in the best examples of the antique.

In the decorations of the interior of all apartments, where much delicacy is requisite, the height of the entablature may be reduced even to one-fifth of the column, by observing the same method, and making the module only four-fifths of the semi-diameter.

The Antique Ionic Capital, not only in the Grecian but Roman style, differs from all others; inasmuch as the front and side forms are not similar. This particularity occasions great difficulty, whenever breaks are introduced in the entablature, or where the decorations are continued in flank as well as in front: for, either all the capitals in the returns must have the baluster side outward, or the angular capital will have a different appearance from the rest, neither of which is admissible where good taste prevails.

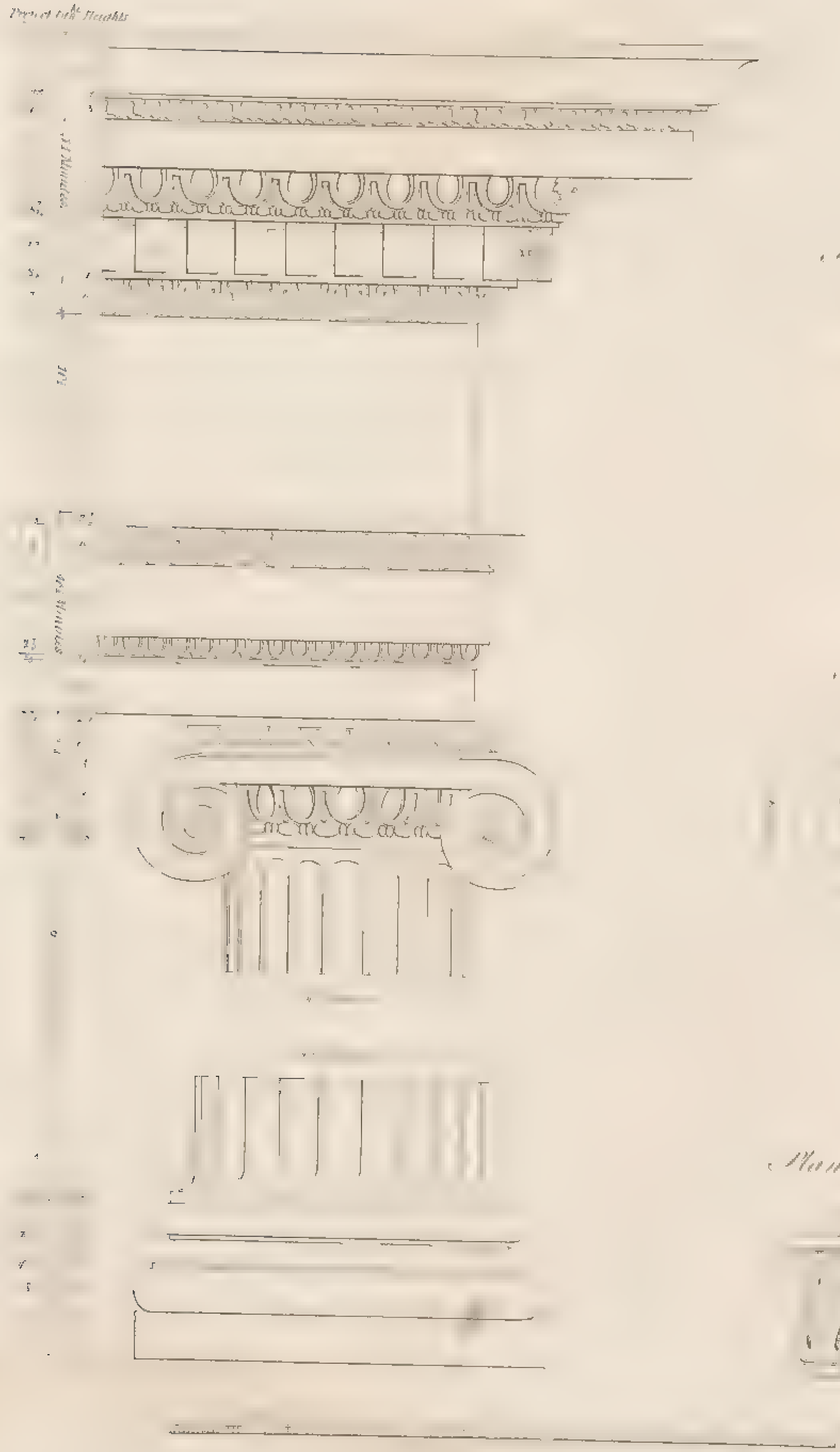
The architect of the Temple of Fortune, at Rome, as likewise the scientific artist who designed the small temple on the River Ilissus, have each fallen upon expedients which, in some degree, remedy the defect above-mentioned. In each of those buildings, as well as others, the corner capitals have their angular volutes in *oblique* positions, inclining equally to the front and side, and presenting volutes both ways: and, says Chambers, where persons are violently attached to the antique, or furiously bent on rejecting all modern inventions, however beautiful, this

is the only way to gratify them; but, when such is not the case, the angular capital invented by Scamozzi, and lately imitated in the circular portico of Langham Chapel, may be introduced; for it must be allowed that the distorted figure of the antique capital, as represented in *Plate* XXI, of the *Orders*, with one straight volute and the other twisted, is very objectionable, and far from being pleasing to the eye; yet we are of opinion that the Grecian antique volutes, as carved at the East-India House, in Leadenhall-Street, at the Saint Pancras new church, at the College of Surgeons, in Lincoln's-Inn Fields, and in various other public buildings, are worthy of imitation; and therefore we cannot better discharge our duty than by recommending the student first to draw all the specimens given in this work, and as he proceeds, if opportunities permit, to examine the buildings above-mentioned, or such as are of a similar description.

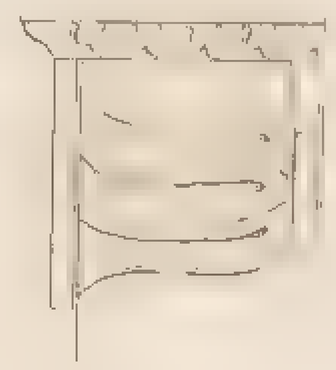
As the Doric order, says Chambers, is particularly affected in churches and temples dedicated to *male saints*, so the Ionic is chiefly used in such as are consecrated to females of the matronal state. It may, likewise, be employed in Courts of Justice, as well as the Roman or Grecian Doric; it may also be introduced in libraries, colleges, seminaries, and other structures having relation to arts or letters, and also in private-houses, and in palaces to adorn the ladies' apartments: and, says Le Clerc, in all places dedicated to peace and tranquillity. The antients employed it in temples sacred to Luna, to Bacchus, to Diana, or other deities, whose dispositions hold a medium between the severe and the effeminate.

The Grecian Ionic specimens of capitals, cornices, friezes, and architraves, are, generally speaking, better profiled than those of the Romans: the judicious composer should, therefore, contemplate the several parts appertaining to each style; and, by alternately rejecting and adopting, he will, by degrees, improve his taste: but, as regards the bases of the Grecian Ionic order, usually employed in the antique, we cannot recommend them, although most slavishly adopted by many of our modern practitioners. The attic base of the Romans is the best, simplest, and most natural; and, wherever applied, is sure to give satisfaction: it is, therefore, recommended to the serious consideration of the student.

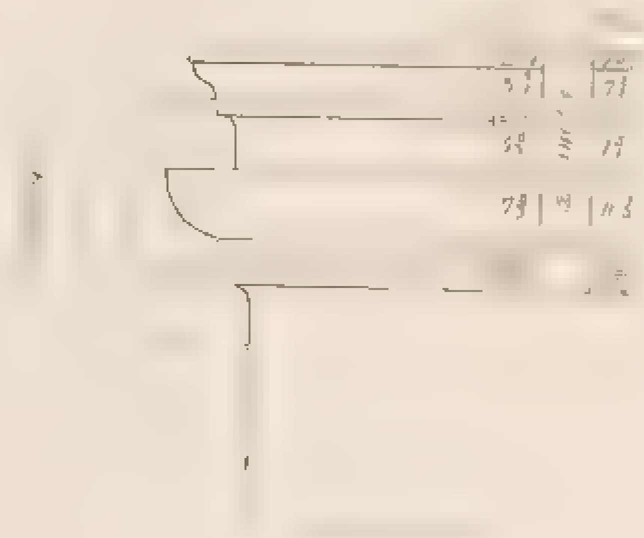
ROMAN IONIC ORDER.



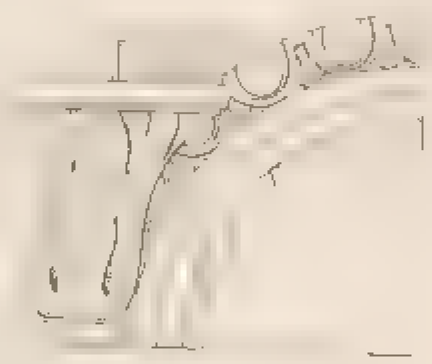
Side of the Capital.



Profile of the Capital.



Plan of the Capital



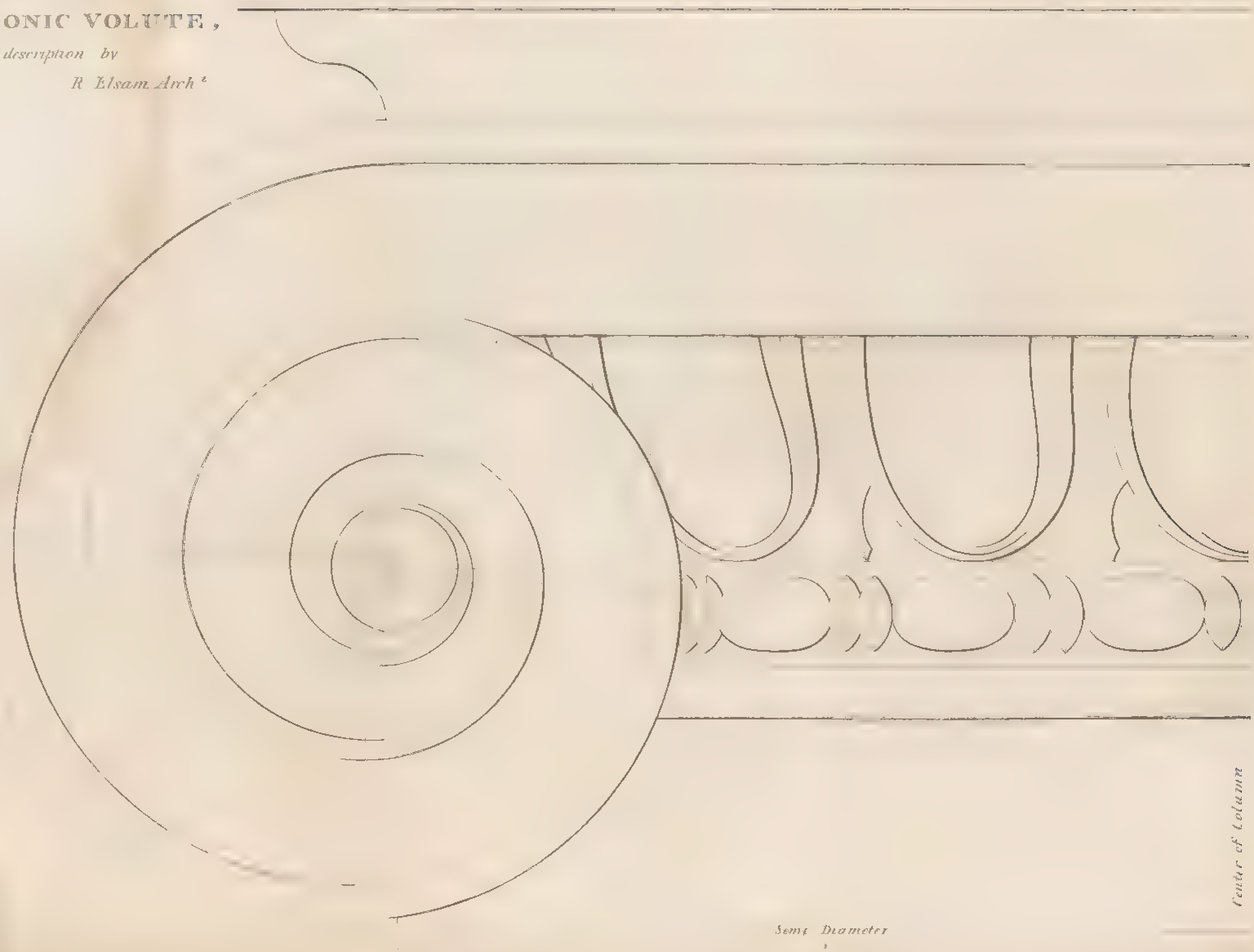
London Published by Thos. Kelly · 17 Paternoster Row Jan.y 22 1825

The Contour & Proportion of a

ROMAN-IONIC VOLUTE,

from a description by

R. Elsam Arch.t



IONIC ORDER.

FROM THE IONIC TEMPLE, ON THE ILISUS AT ATHENS.

Drawn by M. A. Nicholson.

Engraved by W. Symns

London Published by Tho. Kelly 17 Paternoster Row, December 18

GRECIAN IONIC CAPITAL.

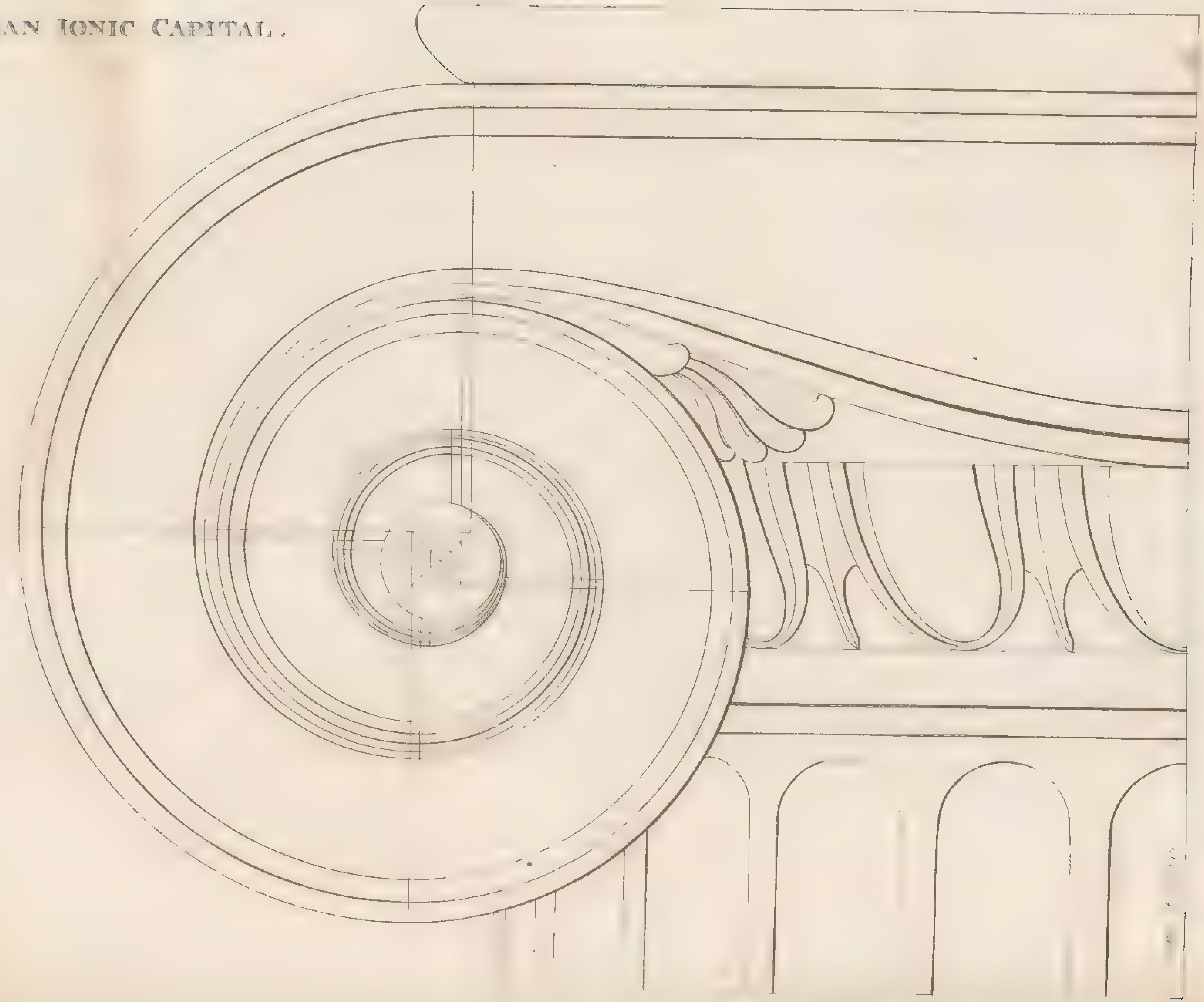
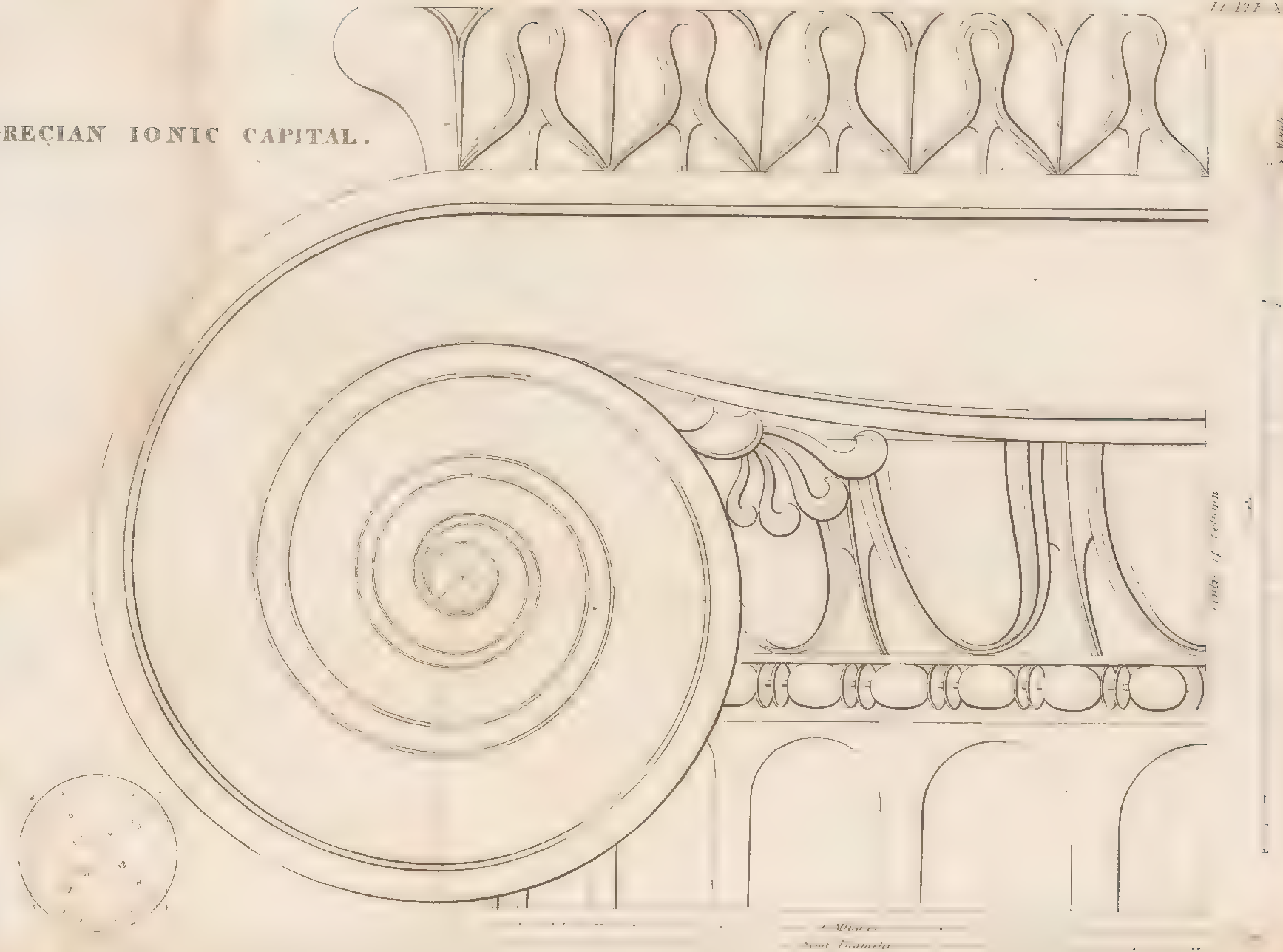


PLATE No. II

GRECIAN IONIC CAPITAL.



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GRECIAN IONIC CAPITALS.

Fig 2

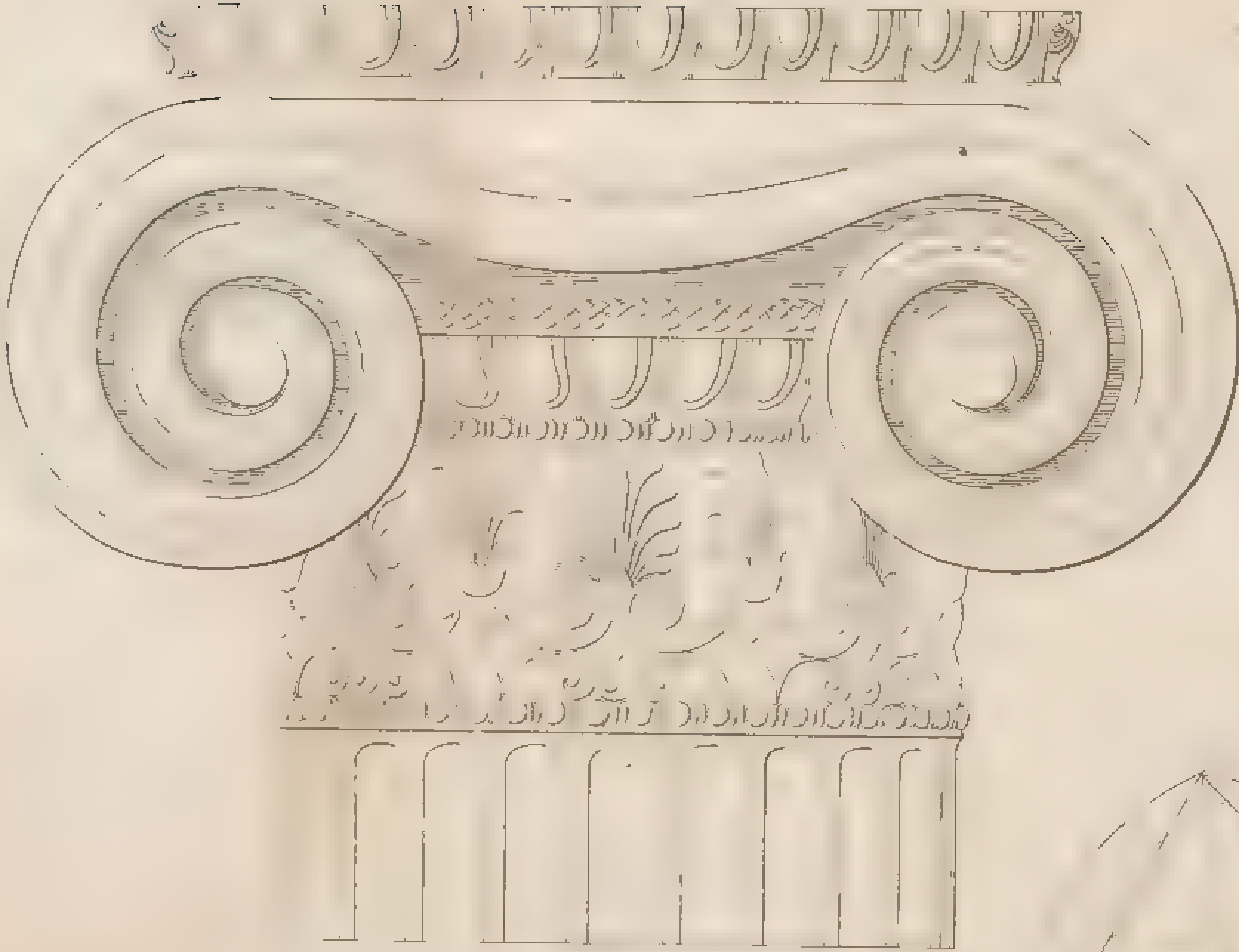
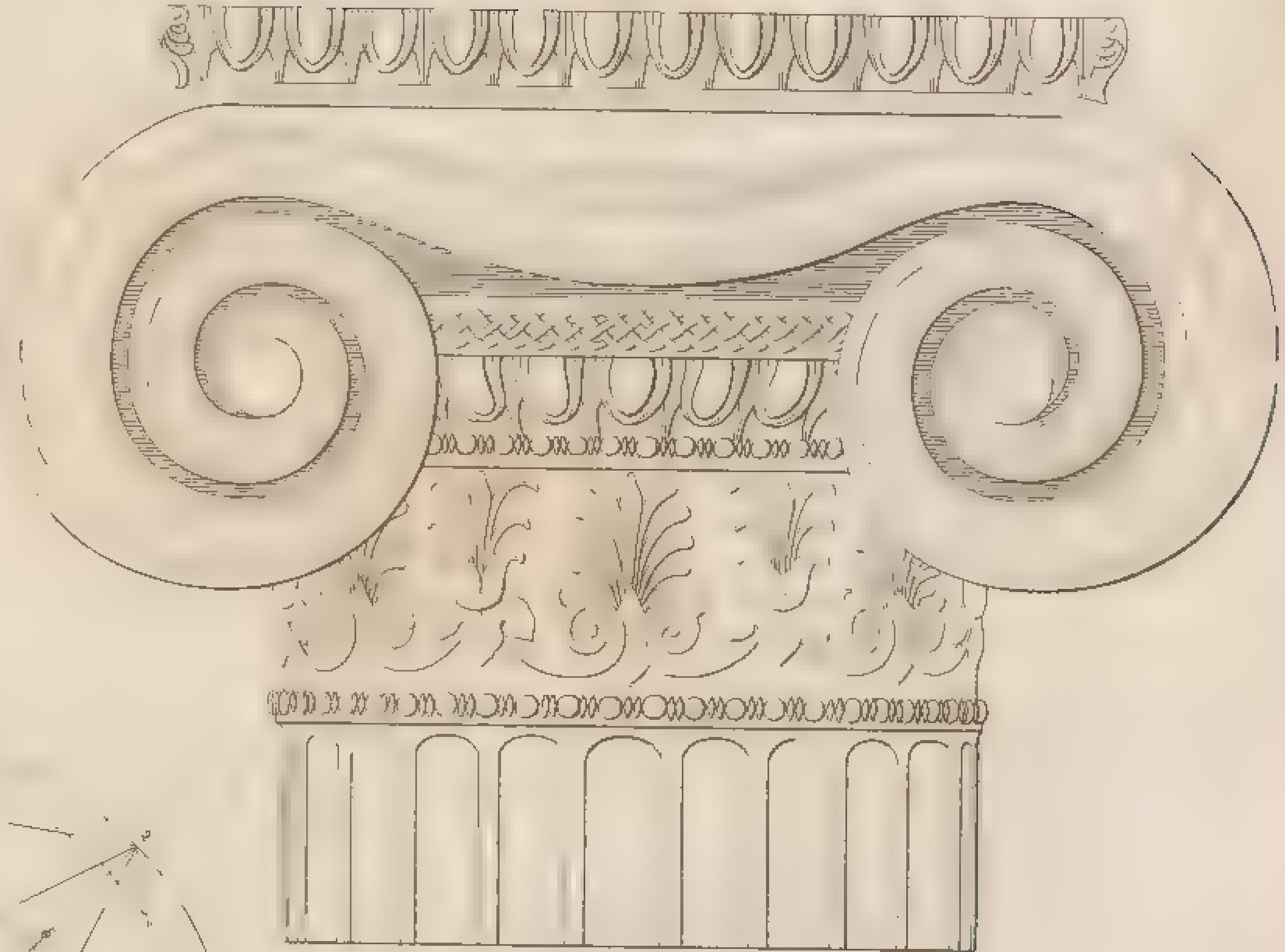


Fig 4



30 Minutes

Fig 5

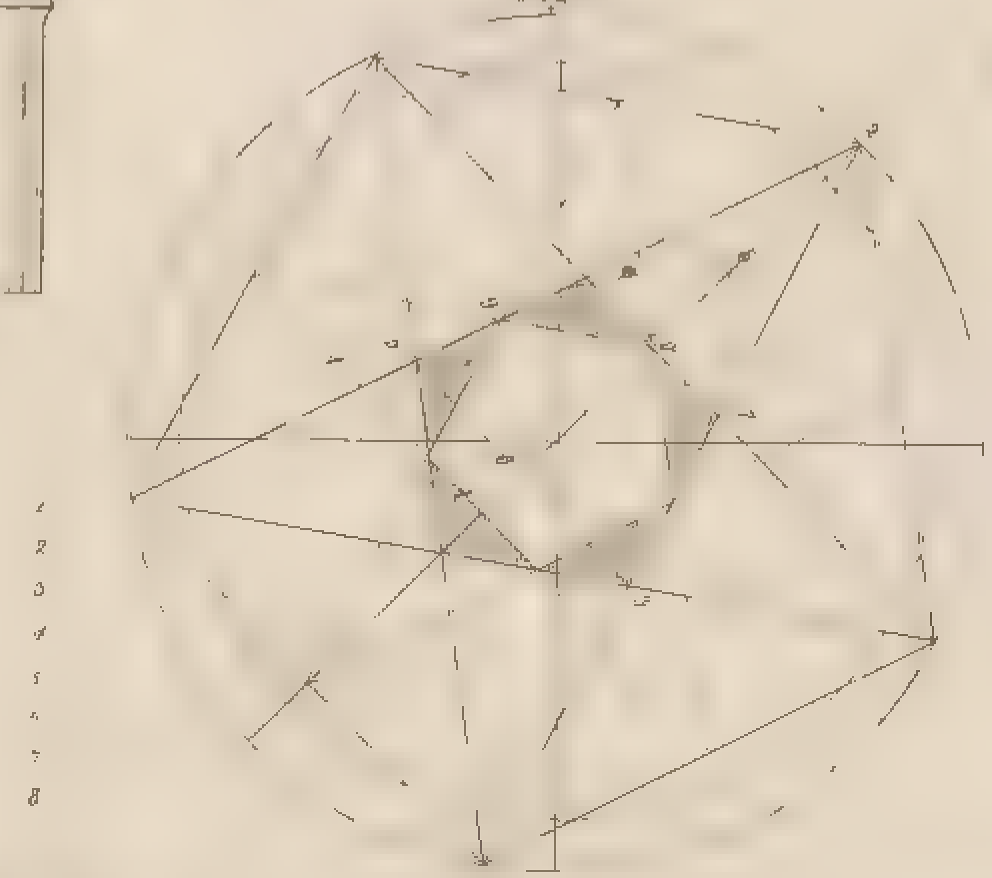


Fig 1

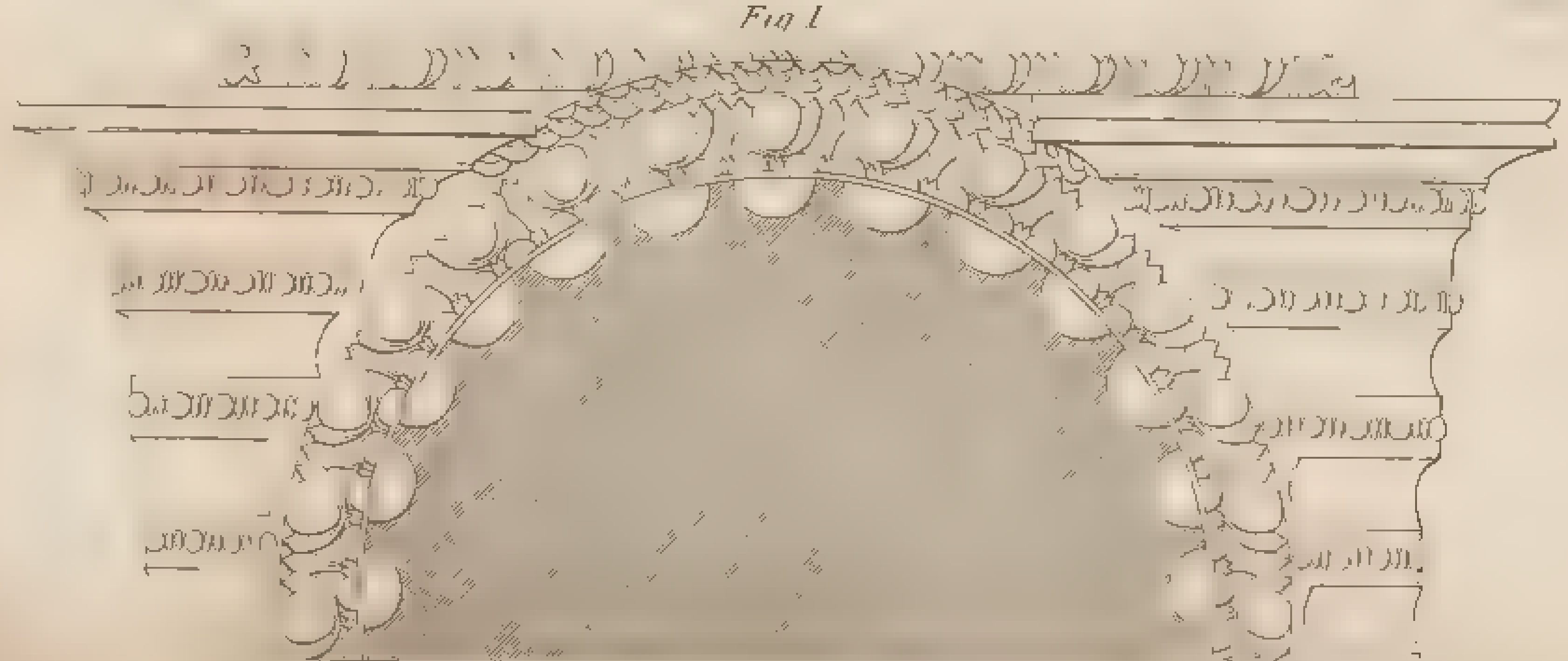
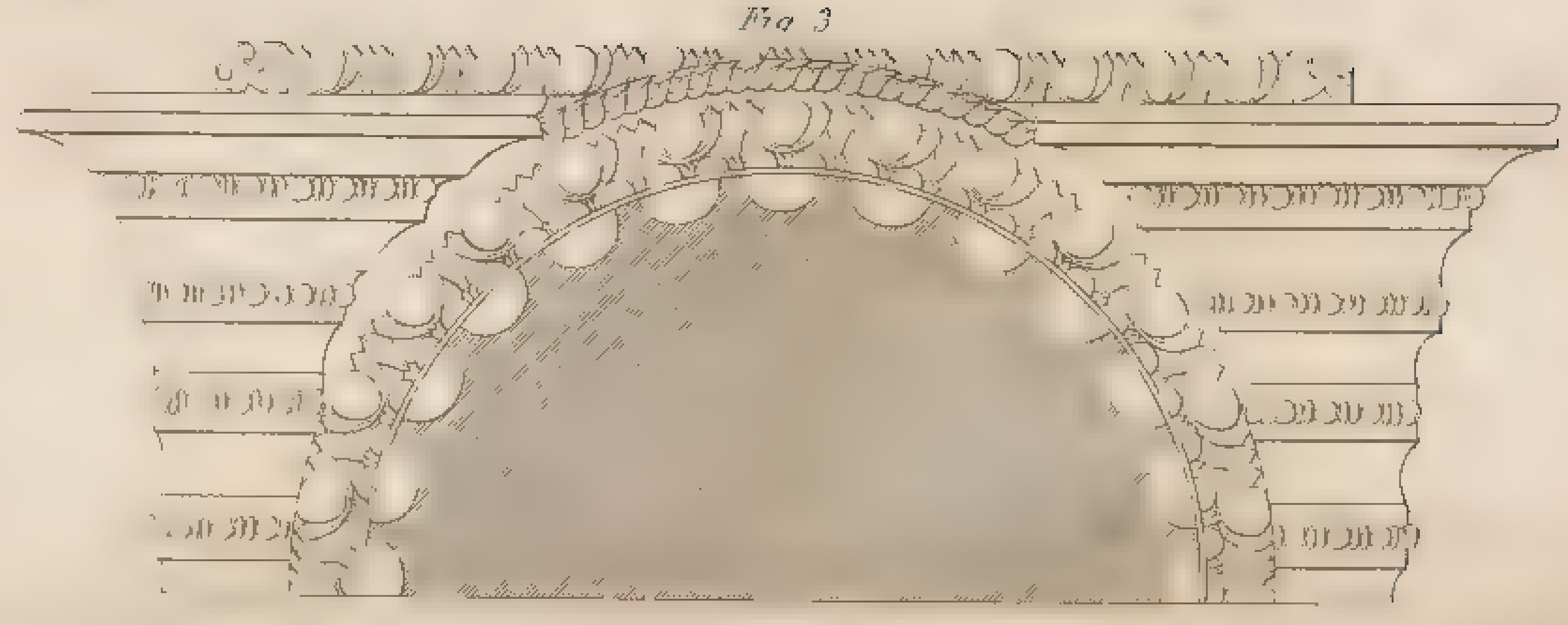


Fig 3



REFERENCES TO THE PLATES APPERTAINING TO THE IONIC ORDER, WHICH INCLUDE THE ROMAN AND GRECIAN EXAMPLES.

ORDERS, PLATE VI.—*Fig.* 1 represents the entablature and capital of the Roman Ionic order, on a large scale, proportioned by modules and minutes.

Fig. 2 represents the attic base to the same scale.

Fig. 3.—Plan of one quarter of the capital.

Fig. 4.—Section of the capital.

Fig. 5.—Half the elevation of the barrel.

ORDERS, PLATE IX.—The contour and proportion of a Roman Ionic Volute, with the appendages; from a description by Mr. R. Elsam, architect, on a large scale.

ORDERS, PLATE XV.—*Fig.* 1. The entablature and capital of the Grecian Ionic Order, in imitation of the Ionic portico to the small temple on the River Ilissus.*

Fig. 2.—Half the base.

Fig. 3.—Half the section of the capital.

Fig. 4.—Altitudinal scale of the base.

ORDERS, PLATE XVI.—Grecian Ionic capital at large, in imitation of the last example, by Mr. R. Elsam.

ORDERS, PLATE XVII.—Grecian Ionic capital at large, in imitation of the example in the Minerva Polias, at Preene, by Mr. R. Elsam.

ORDERS, PLATE XVIII.—*Fig.* 1. Plan of the Ionic capital from the Temple of Erectheus, at Athens.

Fig. 2.—Elevation of the last-mentioned capital.

Fig. 3.—Plan of the Ionic capital, from the Temple of Minerva Polias, at Athens.

Fig. 4.—Elevation of the last-mentioned capital.

Fig. 5.—Diagram, on a large scale, shewing the minutiæ of finding the different centres for striking the two last described volutes; which, by an attentive examination, will teach the inquisitive student every thing which is requisite on the subject.

* An interesting view of this capital is given hereafter, under the article of "PERSPECTIVE," from a drawing by Mr. Michael Angelo Nicholson.

Orders, Plate XIX.—*Fig.* 1. Flank elevation of half the Ionic capital, as executed in the Temple of Minerva Polias, at Athens.

Fig. 2.—Section of the same, shewing the barrel of the volute.

Fig. 3.—Transverse section of the same capital.

Fig. 4.—Transverse section of the Ionic capital, in the Temple of Erectheus, at Athens.

Fig. 5.—Flank elevation of the same capital.

Fig. 6.—Section of the same, showing the barrel of the volute.

Orders, Plate XX.—*Fig.* 1. Grecian Ionic entablature, appertaining to the Temple of Minerva Polias, at Athens.

Fig. 2.—Base of the columns to the above order.

Fig. 3.—Half the base of the antæ to the same example.

Fig. 4.—Half the capital of the antæ to the same.

Orders, Plate XXI.—*Fig.* 1. Plan of an angular Grecian Ionic capital, in imitation of those employed in the small temple on the River Ilissus.

Fig. 2.—Flank elevation of the capital.

Fig. 3.—Section of the capital.

Fig. 4.—Section, showing the barrel of the capital.

Orders, Plate XXII.—*Fig.* 1. An antique Grecian Ionic base.

Fig. 2.—An antique Grecian Ionic capital.

Fig. 3.—An antique Grecian Ionic base.

Fig. 4.—An antique Grecian Ionic capital.

PRACTICE OF THE COMPOSITE ORDER.

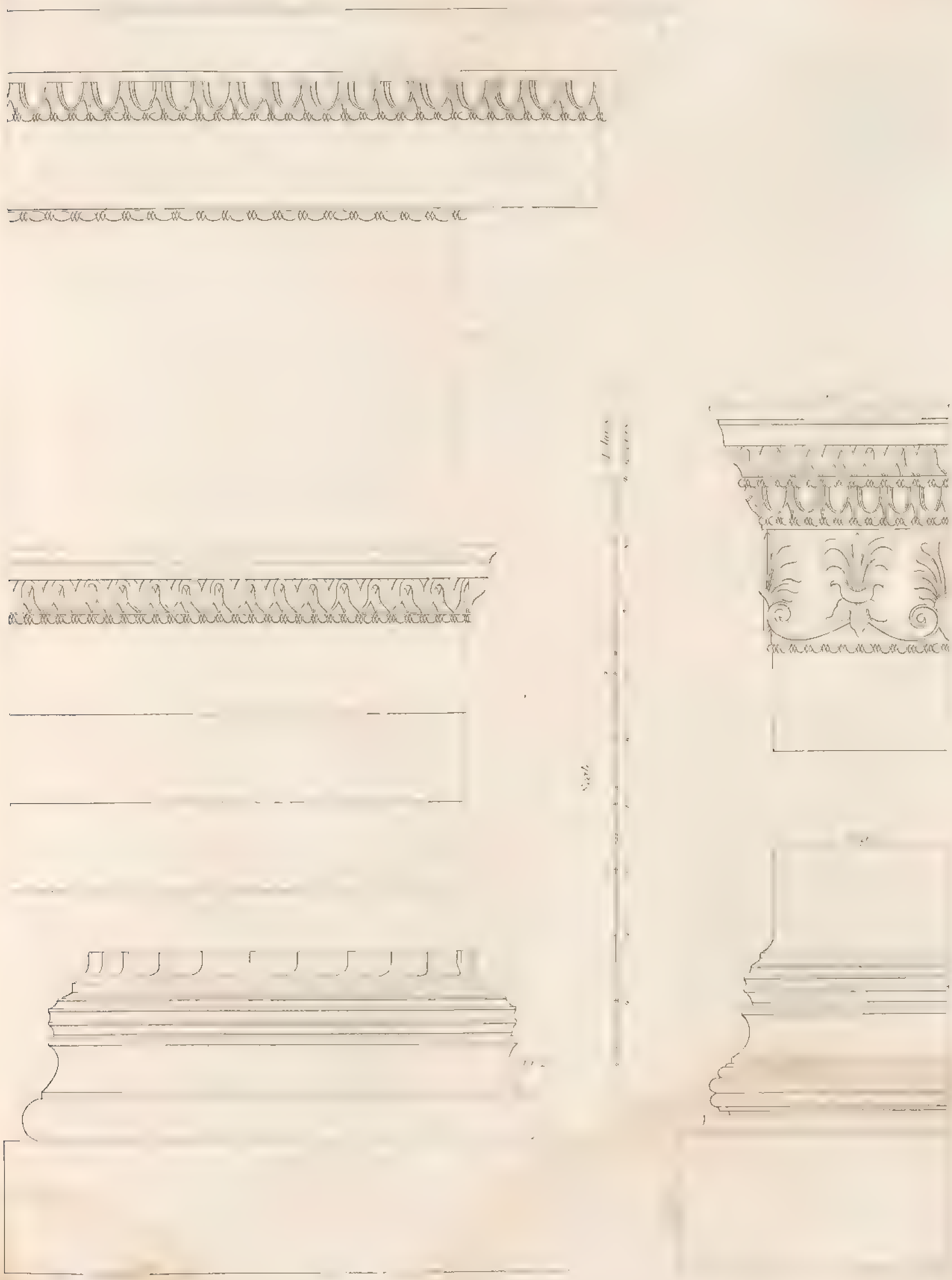
Correctly speaking, the Grecians and Romans had but three recognized orders; the Composite and Tuscan not having been acknowledged by the antients: the moderns, however, have ranked the two latter with the three original orders, which are the Doric, Ionic, and Corinthian. It is the practice with most authors to give to the Composite the fifth or last place; as being the last invented; and also from being a compound of all the rest, which, of course, ought to be pre-

ELEVATIONS & SECTIONS OF GRECIAN IONIC CAPITALS.

R. Adlard Sculp.

London Published by Thos. Kelly 17 Paternoster Row Decr. 11 1824

GRECIAN IONIC ENTABLATURE BASES AND ANTÆ.



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GRECIAN IONIC CAPITAL.

Fig. 2

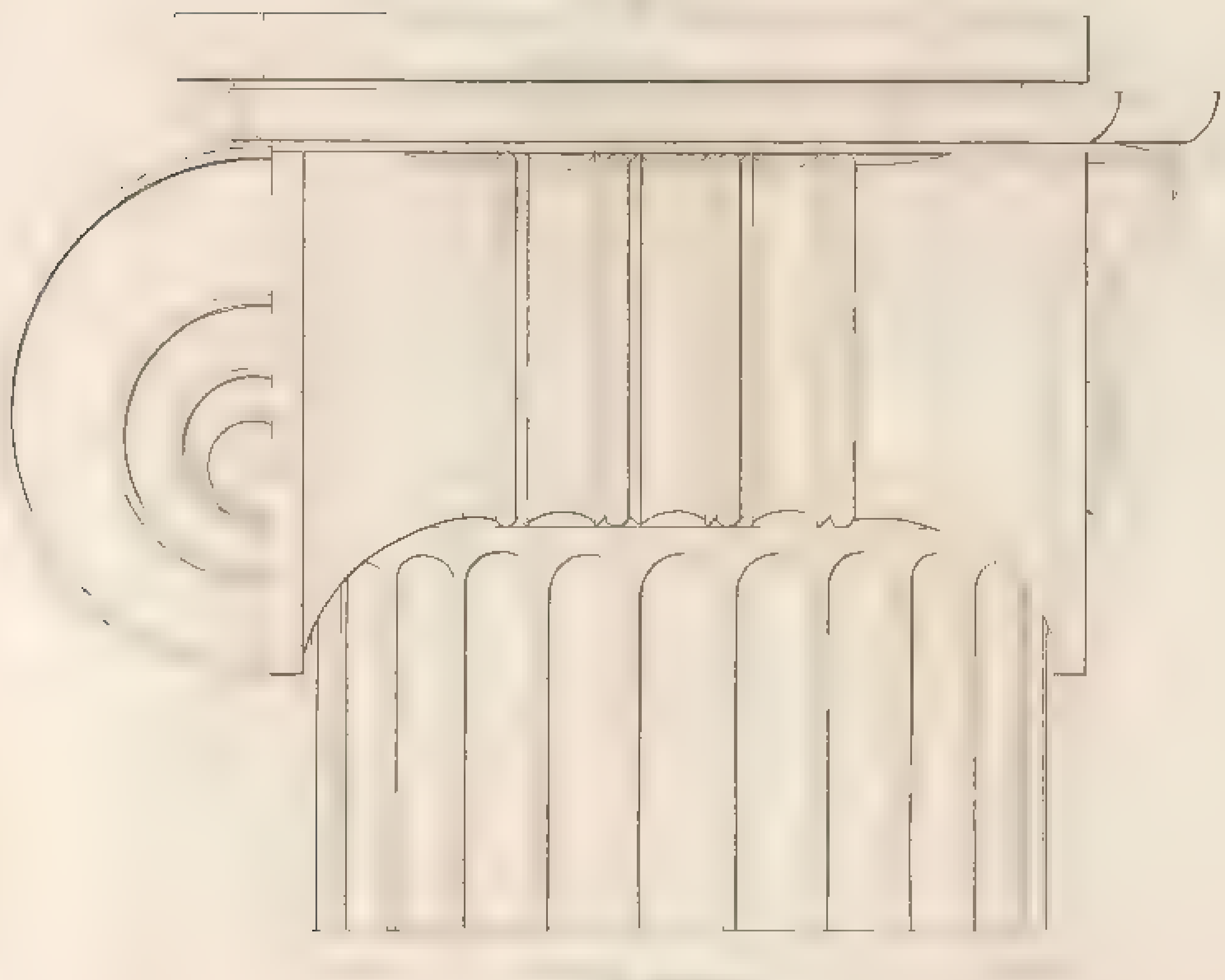
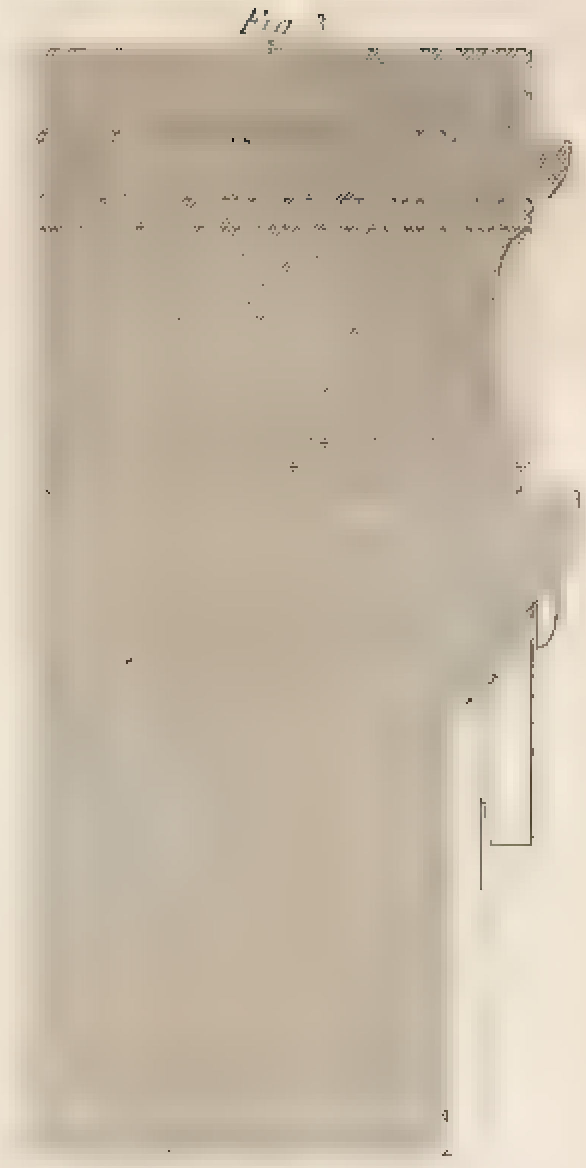
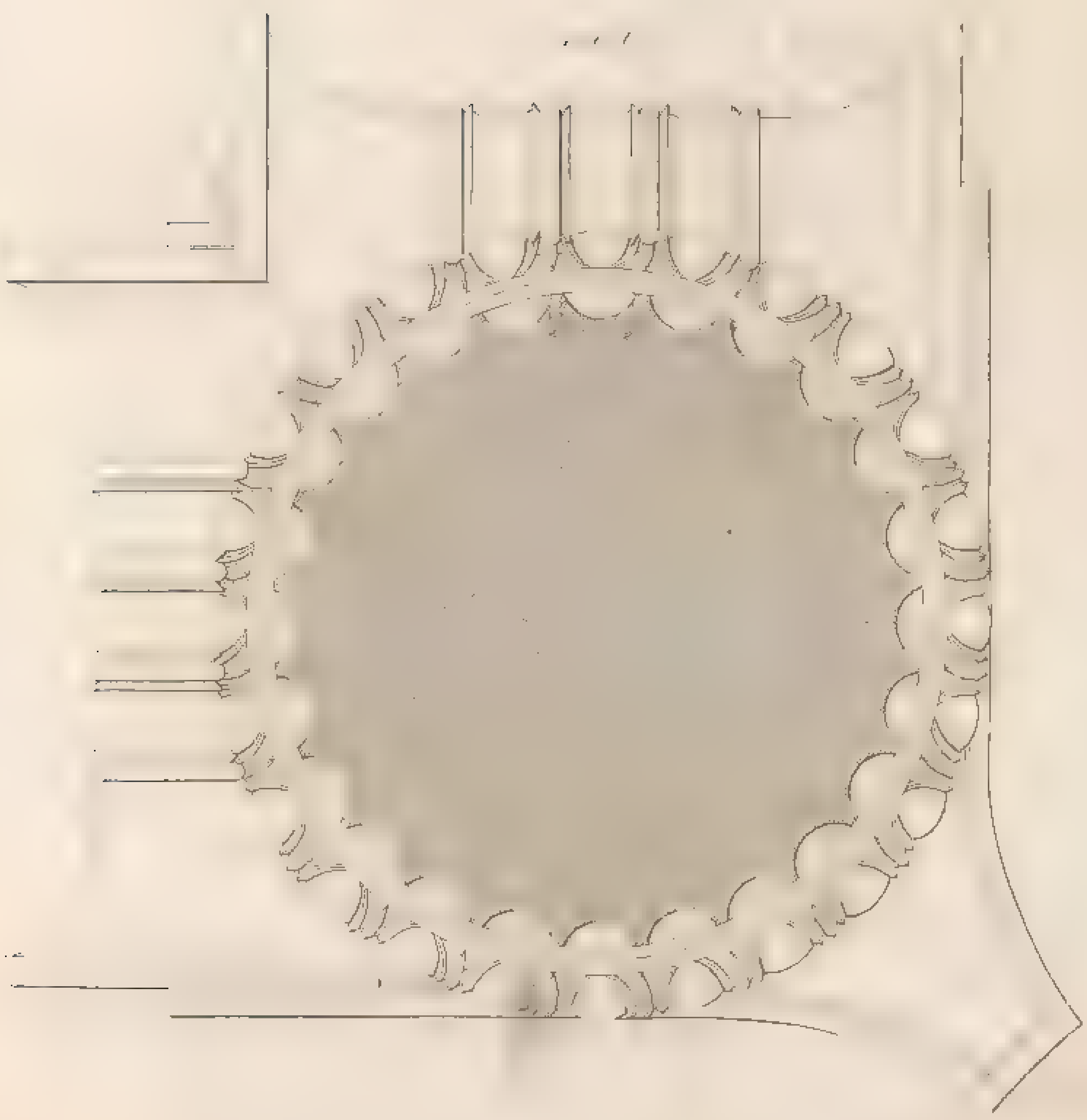
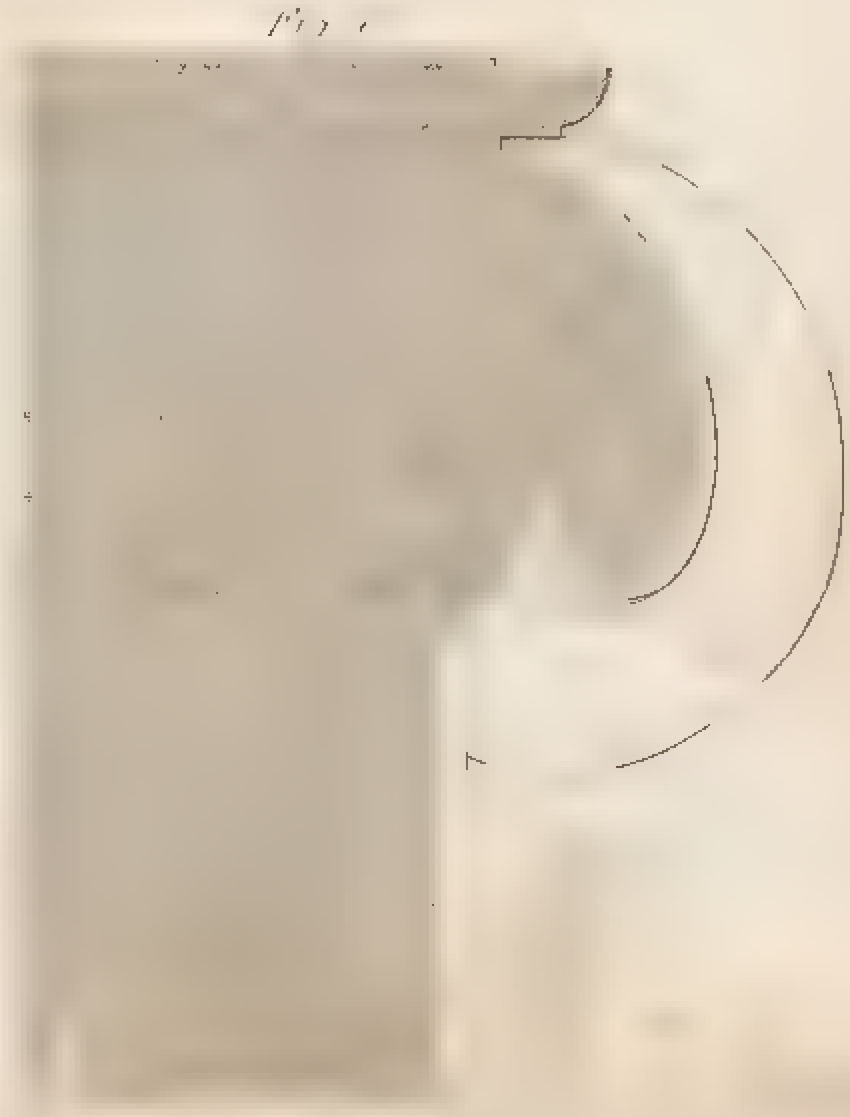


Fig. 3

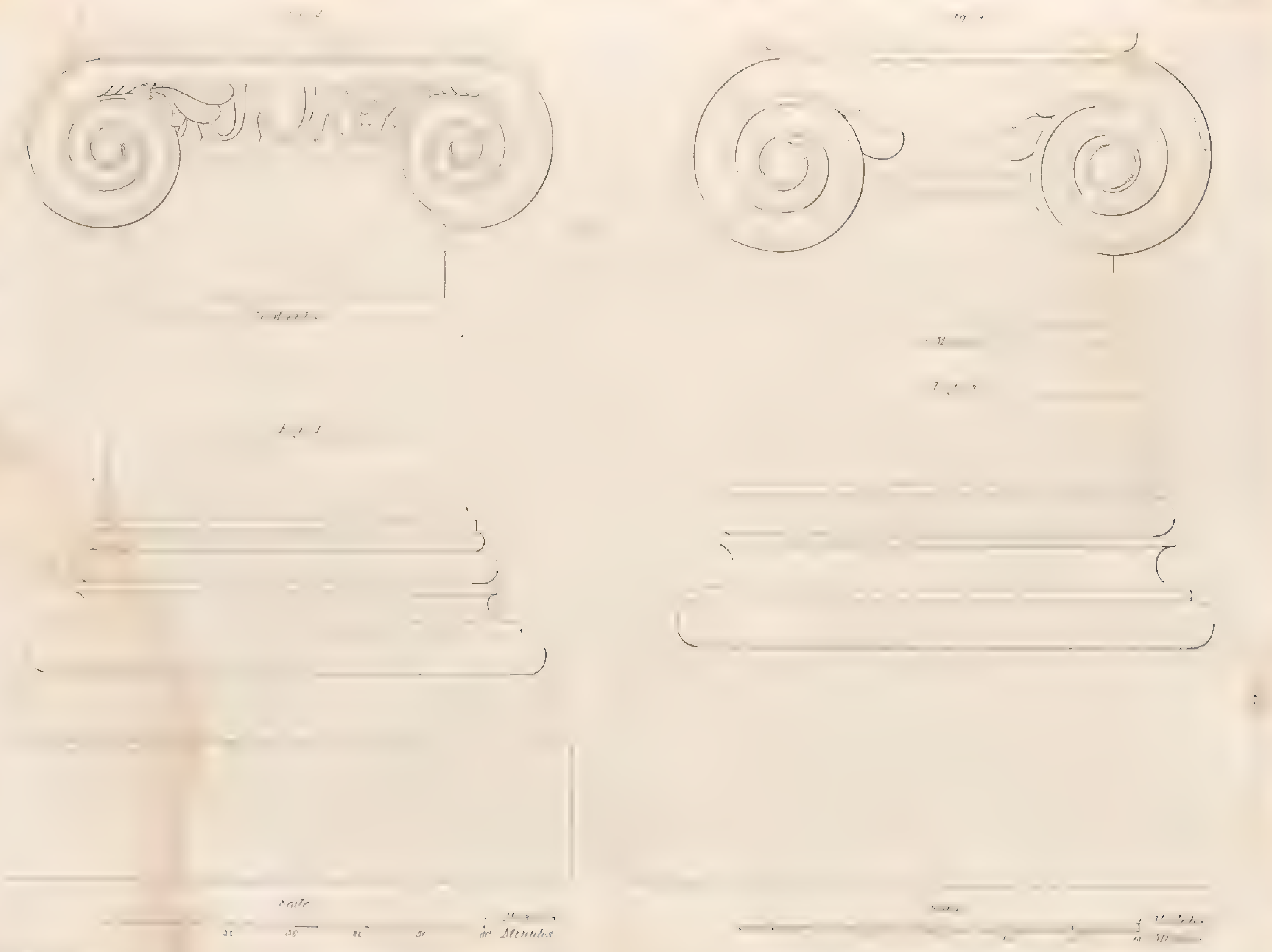






3 Modules

GRECIAN IONIC CAPITALS AND BASES.



ceded by those which are the simplest. But Chambers has followed Scamozzi's arrangement; it being the most natural for the orders to succeed each other according to their degrees of strength, and in the progression that ought to be observed, when they are employed together.

Palladio, Scamozzi, Vignola, De Cambrai, Serlio, and Delorme, together with other modern architects, have each followed the bias of their own inclinations in designing the Composite order: fac-similes, or counter-likenesses, are, therefore, seldom to be met with; it is, however, manifest, from an examination of the best works, that the order now under consideration is compounded, chiefly, of the component parts of the Ionic and Corinthian, without possessing the native simplicity and elegance appertaining to the two latter classical orders. The Composite is, nevertheless, an order of considerable merit, which, on many occasions, will claim a decided preference, and cannot fail to be duly appreciated when judiciously introduced.

The modern architects, says Chambers, have varied more in this than in any of the orders; and De Cambrai observes, that, abandoned by their guide, Vitruvius, and left entirely at large, they have all taken different paths, each following the bent of his own particular fancy; and among them, Serlio has been the least successful; having chosen for the model of his entablature that of the fourth order of the Coliseum: a composition too clumsy even for a Tuscan order. Delorme, however, has followed his example, and has mistaken the fourth order of the Coliseum, which is Corinthian, for the Composite; and Palladio, in his profile, has imitated the frontispiece of Nero, and corrected its defects with much judgement. His architrave is also copied from the same building: but he has omitted the beautiful frieze, and has submitted in its place a swelled one, similar to the Basilica of Antonius. His entablature is too low, being only one-fifth of the column; and it is also singular that, although he has made the column more slender than in the Corinthian order, yet his entablature is far more heavy; it being composed of fewer and larger parts. His capital and base are imitations from the arch of Titus, the latter of which is designed without a plinth, as it is executed in the Temple of Tivoli, and joined to the cornice of the pedestal, as may be observed by reference to *Orders, Plate* X, on which is also represented the capital adverted to, and which has been lately adopted in the hexastyle portico, by Mr. George Smith, in the front of Saint Paul's New School, opposite

the east end of the Cathedral; it has been adopted, likewise, at the Bank of England, by Mr. Soane. The capital here noticed is described as Corinthian, but with more correctness, perhaps, it might be termed a Composite capital; from its being a medium between the Corinthian and Composite referred to in Chambers' orders, which have been followed in this work, that is, as regards the Roman principles or style of architecture.

Vignola's composition of this order has nothing remarkable about it. The architrave varies but in a very small degree from the frontispiece of Nero, and the cornice is nearly the same as the Ionic composed by him; the chief difference consisting in the transposing of mouldings and the enlargements of dentils, each of which appear to be alterations much for the worse.

And Scamozzi's entablature is like Palladio's; that is, only one-fifth of the height of the column; and, being much divided, produces a very trifling appearance. The cornice, however, is well composed; and is also, in a great degree, imitated from the third order of the Coliseum. The capital is similar to Palladio's, and the base is attic, enriched with astragals in accordance with the Basilica of Antonius.

The engraved design here referred to, in imitation of Chambers' Composite order, is the invention of that learned architect, who states that he has attempted to avoid the faults, and to unite the perfections, of those before-mentioned; but how far he has succeeded is left to those who have judgement to discriminate. Under any circumstances, however, the student may refer to Palladio, Scamozzi, or Vignola, which has been the practice heretofore.

The height of the column is twenty modules; the entablature five; the base is attic, and its measures are precisely the same as in the Doric and Ionic orders; but, as the module is less, all the parts are of course proportionately delicate. The shaft is enriched with flutings, which may be either to the number of twenty or of twenty-four, similar to the Ionic order; for we cannot see any reason why, in the different orders, their number should be either augmented or diminished. The module being less, the flutes will likewise be less, and correspond exactly with the character of the rest of the composition.

The general effect of the capital is very nearly of the same description as those of the moderns; being enriched with leaves, in imitation of the acanthus, as most of the antique capitals of the Composite order are. But, as regards the method

of tracing the minutiæ of these capitals, few instructions, it is presumed, will be deemed sufficient; the design having been correctly drawn and figured by a very accurate draftsman.

The curves of the abacus are described from the summits of equilateral triangles; the projections of the volutes are determined by lines drawn from the extremities of the astragals to the extremities of the horns of the abacus; and, the projections of the leaves are determined by other lines drawn parallel to those from the fillet under the astragal.

The style and manner, says Chambers, of executing these and other enriched capitals in the metropolis, is, generally speaking, bad; but it is evident that he did not mean, in the aggregate, to accuse our workmen of want of talent or capacity; many of them, says he, cannot be excelled in neatness of execution; and, perhaps, in point of workmanship, they do, for the most part, eclipse those of any other country: but it frequently happens, from the want of liberality in their employers, and, in some degree, perhaps, from want of thorough skill and facility in designing, that their performances are very insipid, tame, and without effect, and by no means expressive of the taste or intelligence intended to be conveyed in the designs which have been ordered to be carried into execution.

It is, also, to be regretted, that the greatest architects have too much neglected the detail; having directed their attention chiefly to the general disposition of their compositions. This neglect, though authorized by some great men, ought not, by any means, to be imitated. It is not only the province, but the duty, of the architect strictly to attend to the minutest parts, as well as to the most considerable. Where the entire execution of a fabric is left to his direction, the faults that are committed will, of course, be carried to his account; and, therefore, it behoves him to be choice and extremely select in employing the ablest workmen, and to furnish them with all manner of proper models and precise instructions; in which he will at once announce the extent of his capacity, and distinguish himself from the common herd of those who, without the requisite qualifications, arrogate the title of architects. The most masterly disposition, says Chambers, incorrectly executed, can be considered only as a sketch in painting, or as an excellent piece of music, miserably murdered by village fiddlers, equally destitute of taste and powers of execution.

The Ionic, Composite, and Corinthian, capitals, to be seen in various parts of

the new buildings at Somerset-House, London, were copied by the author last mentioned, from models executed under his directions at Rome, and imitated, both in point of form and manner of workmanship, from the choicest antiques; hence they will serve as guides to those who are anxious to obtain information at the fountain head; and, by a careful examination of them, the student may obtain such information as cannot be conveyed by the most powerful language, or the most intelligent designs.

The entablatures of the Composite order, in *Plates* II. and VII., bear the same proportion to each other as the Ionic and Tuscan orders. The architrave is nearly of the same form with those of Palladio and Vignola. The frieze may be enriched with foliages in imitation of the antique; but the prominent parts should never project more than the uppermost moulding of the architrave under them.

The cornice is imitated from Scamozzi, and differs from the Corinthian only in the modillions, which are square, and composed of two fascias. The soffit of the intervals between the dentils should be hollowed out upwards, behind the little fillet in front, which is the case in most of the antiques; and the incisions produce dark shades, tending to mark the dentils more distinctly. From the same reasons similar methods should also be observed in the Ionic and Corinthian orders. The roses, in the soffit of the corona, should not project beyond the horizontal surface; and care should be taken not to vary them so much as at St. Peter's, of the Vatican, and some modern buildings, because the unity suffers thereby: the modillions or dentils might, with almost as much propriety, be varied. It will, therefore, be proper, in small compositions, to make them all alike, as they are in most of the antiques; to the end that they may not arrest or occupy too much the attention of the spectator, as objects intended for distinct contemplation; but, simply, as parts of the entire. In larger compositions, they may be of two kinds, as in the Long-room of the new Custom-House, in London, designed and carried into effect under the direction of Mr. David Laing, an architect not less eminent for having planned and executed some good and useful structures, than for his excellent treatise on building, contained in his work, entitled "Plans of Buildings, Public and Private."

In the elegant and spacious room just mentioned, the ornaments in the three domical, coved, or vaulted, soffits are of two sorts; but similar in outline and dimensions, which occasions much variety, but without confusion; for the flowers

ROMAN COMPOSITE ORDER.

Fig. 1

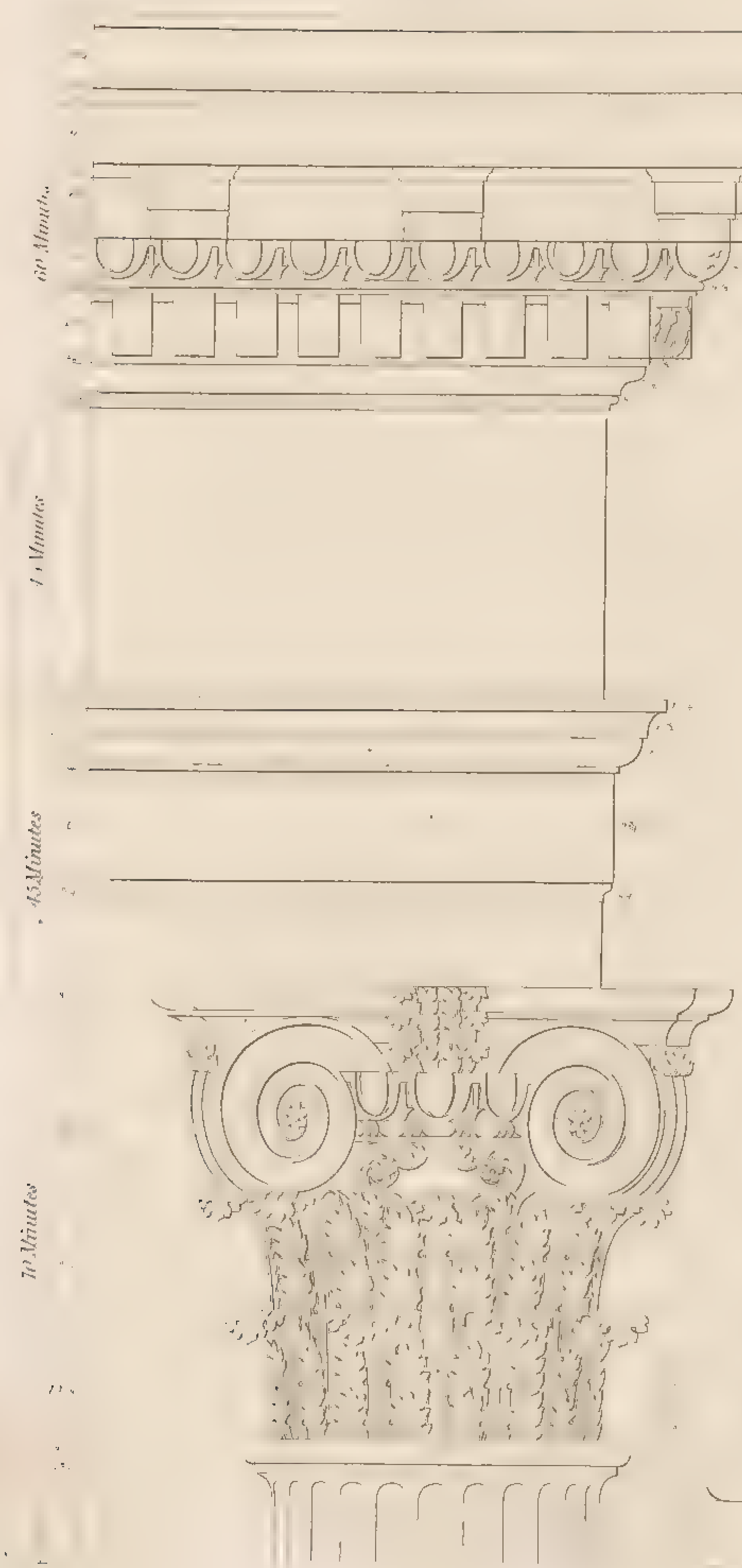


Fig. 3

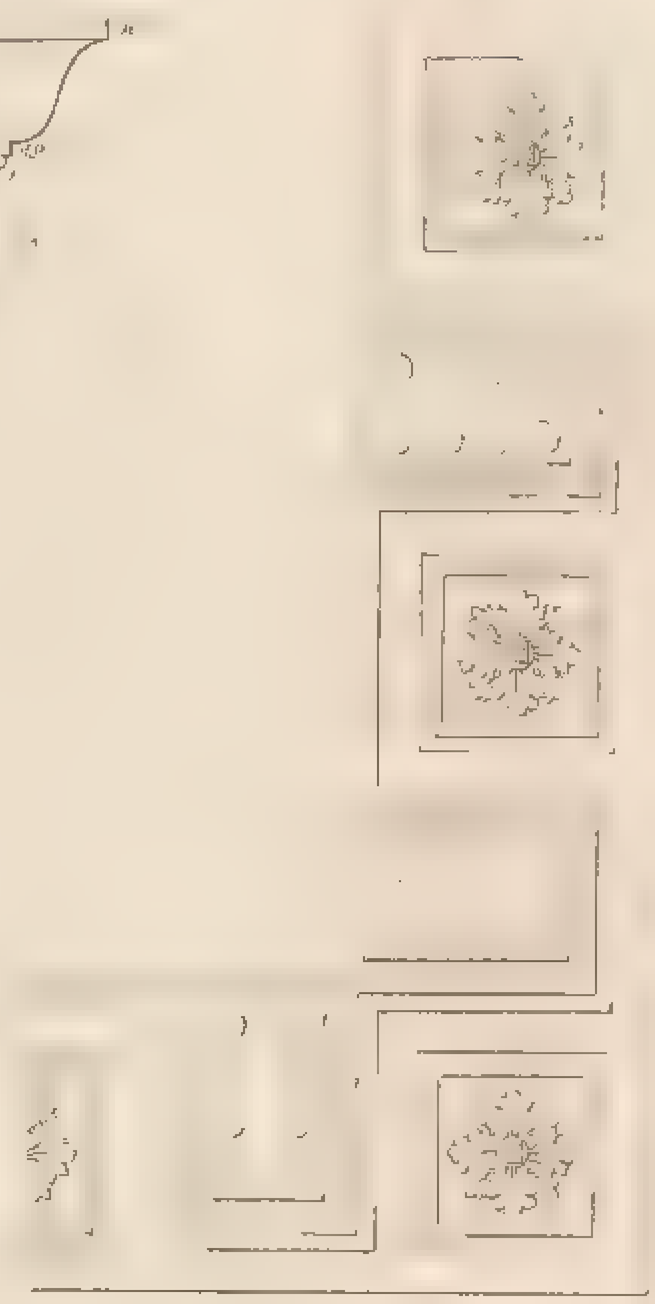
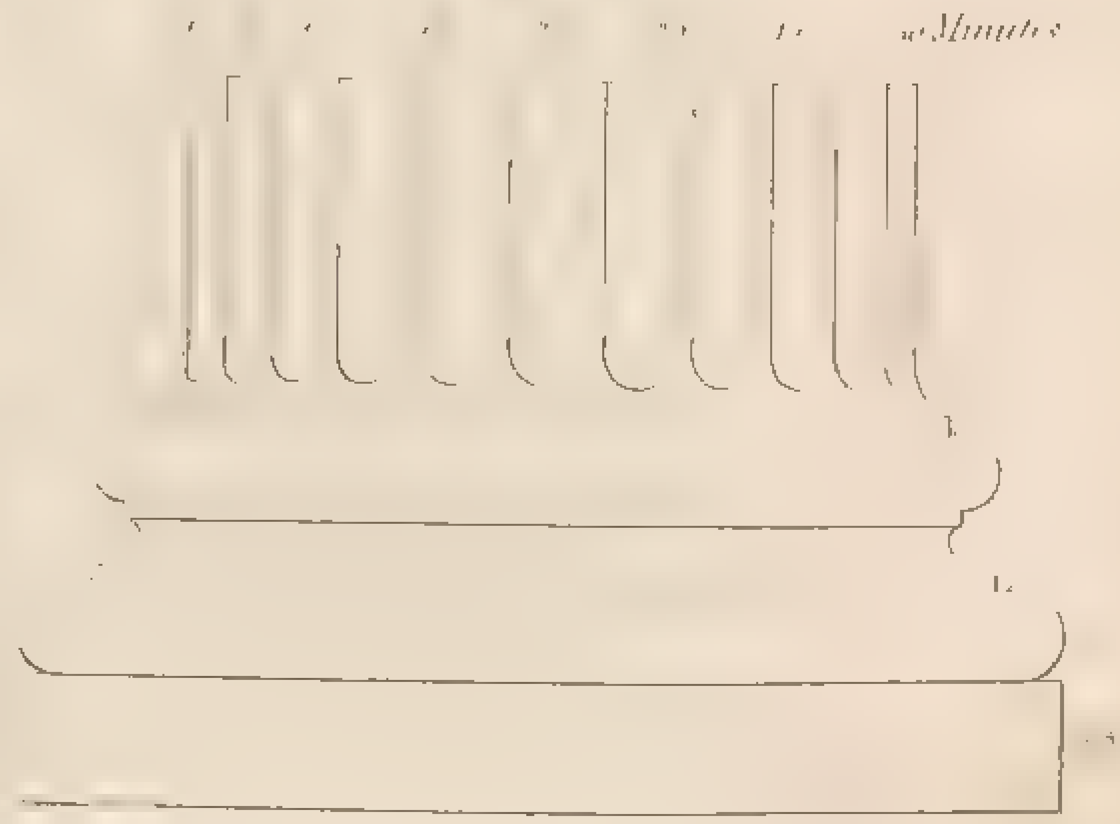


Fig. 2



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Engraved by W. Symns
London, Published by Thos. Kell 17 Paternoster Row, November 1823

succeed each other so rapidly, and are, from their similitude, so immediately and well comprehended, that the third impression takes place before the first is in any degree removed; so that the same effect is nearly produced by alternate successions of the same objects.

The Romans introduced the Composite order more frequently in their triumphal arches than in any other buildings; meaning, as Serlio supposes, to express their dominion over other nations, the inventors of the orders of which this is composed. It may, says Le Clerc, with singular propriety be used wherever elegance and magnificence are to be united; but, more especially, in buildings designed to commemorate great and signal events, or to celebrate the combined achievements of conquerors and legislators; and, from these reasons, that the capitals or other ornaments may be composed of emblems and of allegorical representations, in conformity to the customs of the antients; as appears by numerous fragments of capitals and entire members of architecture scattered about in different parts of Rome, and elsewhere.

The entablature of the Composite order, as introduced in this work, may be reduced to two-ninths of the column; which, to avoid fractions, we will call four modules and one half, by making the module only nine-tenths of the semi-diameter; at the same time observing the same measures as are figured in the design, in which case there will be a dentil in the outward angle similar to the Ionic order. It may also, if required, be reduced to one-fifth, by making the module four-fifths of the semi-diameter: but, in cases where it is requisite to diminish so much, it will be preferable to adopt the Ionic cornice; which, being composed of fewer parts, will retain an air of grandeur without affecting the entire mass.

REFERENCES TO THE PLATE ON THE PRACTICE OF THE COMPOSITE ORDER.

ORDERS, PLATE VII.—*Fig.* 1. Entablature and capital of the Composite order, wherein the heights and projections of the several members are proportioned in the manner already described.

Fig. 2.—The attic base applicable to this order, and similar to the Ionic and Doric in proportions.

Fig. 3.—Shows the plan of the soffit in the entablature, with the manner of finishing the modillions.

PRACTICE OF THE CORINTHIAN ORDER.

This order, says Chambers, is suitable and proper for buildings where elegance, gaiety, and magnificence, are required. The antients employed it in temples dedicated to Venus, to Flora, Proserpine, and the nymphs of fountains; and because the flowers, foliage, and volutes, with which it is adorned, seemed well adapted to the delicacy and elegance of such deities. Being the most splendid of the Five Orders, it is also extremely proper for the decorations of palaces, public squares, or galleries and arcades surrounding them; for churches dedicated to the Virgin Mary, or to other virgin saints: and, on account of its rich, gay, and graceful, appearance, it may, with singular propriety, be used in theatres, in banqueting-rooms or ball-rooms, and in all places consecrated to festive mirth or convivial recreation.

It is an uncontroverted opinion, that the fragments of the three columns in the Campo Vaccino (the supposed remains of Jupiter Stator) were, when entire, and still are, the most perfect compositions of the Corinthian order among the Roman antiques; and it is also the opinion of the most learned, that the best example of the Corinthian order among the Grecians, is that which is employed in the Choragic monument of Lysicrates, commonly called the Lantern of Demosthenes, and which capital is introduced in this work: but, independent of that relic, various specimens of Grecian Corinthian capitals, as well as columns and bases, may, at proper times, be seen among the Elgin Marbles, at the British Museum, in London, where the industrious, in search of information, will find ample gratification. The study of these choice remains, now the sole property of the nation, will, it is presumed, contribute more to rouse the imagination of architects, sculptors, and painters, than all the books, prints, and drawings, which have been published, printed, and made, for the last hundred years. Let the student, therefore, after having obtained the usual elementary knowledge of architecture, advantageously apply his genius and understanding to the consideration of those rare and invaluable materials, on which are engraven the talent, learning, history, and genius, of the Greeks, in characters which cannot fail deeply to affect and influence his imagination.

The possession of the Elgin collection is a treasure to the lovers of the Fine Arts; nor can the fragments, so judiciously selected, be sufficiently appreciated: for, during the few years in which they have been exposed to public view, they have produced such interesting and visible changes in architecture, sculpture, and painting, as cannot fail to impress every susceptible mind with a feeling of gratitude, for the liberal sum voted in Parliament to purchase some of the most valuable relics of architecture and sculpture in the civilized world.

Palladio, in his fourth book, where he gives the entire profile at large of the three Corinthian columns in the Campo Vaccino, acknowledges that he never had seen any work better executed, or more delicately finished; and, furthermore, that the parts were beautifully formed, well-proportioned, and skilfully combined.* Now, upon an impartial view, with reference to the Grecian and Roman Corinthian capitals, no doubt in the world can be entertained that the Roman Corinthian capital is as much superior to the Grecian as the latter Ionic capital is to the Roman. The absurdity, therefore, of prejudiced minds, in favour of every thing which is Grecian, must be manifest: the Romans excelled in some instances, and the Grecians in others; it is, consequently, the duty of the student to avoid being seduced by, or entirely devoted to, Grecian or to Roman principles: in each style there is much to admire and much to condemn. By judicious selections, the man of correct taste, possessing integrity of mind, may evince his judgement by constructing, altering, and changing, without violating the doctrine of good taste.

Vignola's composition of the Corinthian order is uncommonly beautiful, and, without doubt, superior to that of any other master; he having artfully collected all the perfections of the best originals, out of which he formed an entire composition far preferable to any of them.

The design for the Corinthian order given in this work, from Chambers, differs very little from that of Vignola. The column is twenty modules high, and the entablature five, which proportions are a medium between those of the Pantheon, at Rome, and the three columns of the Campo Vaccino. The base of the column may be either attic or Corinthian; each of them are beautiful. Palladio and

* To afford the *amateurs* of architecture a full and comprehensive idea of the beauties of the Antique Roman Corinthian capital, we have given an interesting engraved view of one of the most approved, from an intelligent drawing by Mr. M. A. Nicholson, under the article of "PERSPECTIVE," and to which plate the reader is referred, as well as to *Orders, Plate* VIII, which represents the Corinthian order in detail, as proportioned by Sir William Chambers.

Scamozzi have employed the attic, enriched with astragals; but so frequent a repetition of the same semi-circular forms in junction, produces but an indifferent effect; as may be observed in the bases of the columns at the parish church of Saint Martin in the Fields, and in several buildings of the metropolis, in which the profiles and forms of Palladio, good, bad, and indifferent, have been indiscriminately employed.

If the entablature is enriched, the shaft of the column should be fluted, provided it is not composed of variegated marble, for a diversity of colours renders even smooth surfaces confused, and ornaments of sculpture serve only to make the confusion greater. The flutings may be filled to one-third of the height with cableings, as in the inside of the Pantheon, at Rome, which strengthen the lower part of the column, and renders it less liable to damage. But, when the columns are not within reach, nor subject to be hurt by passengers, the cables are better omitted, as the general hue of the shaft will then be the same throughout, and appear to be of a piece; but, when parts of the flutes are filled, and the other parts left vacant, it is not the case; for the shaft then appears divided, and is liable to produce a great defect.

The capital is enriched with olive leaves, as are most of the antiques, at Rome, of this order; the acanthus being seldom employed but in the Composite order.

With respect to the manner of tracing and working this capital, the design, with what has been said on the same subject in the Composite order, will serve as a sufficient explanation.

The divisions of the entablature bear the same relative proportions to each other as in the Tuscan, Ionic, and Composite, orders. The frieze is sometimes enriched with bas-reliefs, as described in Chambers's *Civil Architecture;* but it is more frequently left quite plain. The parts and ornaments in the cornice are all regularly disposed, and perpendicularly over each other. The coffers of the soffit of the cornice are square, and the borders round them equal on all sides, as they are in the arch of Titus, and as Palladio has made them; a precaution neglected by Vignola, notwithstanding his usual regularity.

The antients, as well as the moderns, have frequently employed the Ionic entablature in the Corinthian order, as appears by many of the buildings: and this is remarkable in the Corinthian portico, erected by Mr. James Gandon, to the entrance of the late House of Lords, in Dublin, now the *approchè* to the Directors'

Court-Room of the National Bank; and, according to Vitruvius, even the Doric entablature has been employed upon Corinthian columns; though, of the latter practice, there is not, as we are aware of, any example extant. The same author furthermore observes, that the Grecians, in their works, never employed the dentils under the modillions. It is, however, certain that the Romans were not so fastidious or over nice; for, in their most esteemed works, such as the Temple of Jupiter Stator, the Forum of Nerva, the Temple of Jupiter Tonans, and several others, we observe the dentils under the modillions; and these examples, it is presumed, will continue to authorize the same practice. The origin and history of these things are extremely remote, and known to but few, while the general effects of such compositions are known to all. If deviating, therefore, from what is little known and less felt, will contribute towards the perfection of that which all see and all approve, it cannot be justly censured.

The liberty, however, of deviating from the origin or reason of things, was by the antients, and must by us, be exercised with extreme caution; as it opens a wide door to whim and extravagance, and leaves a latitude to the composer, which often betrays and hurries him into ridiculous absurdities.

When the modillion cornice is employed on large concave surfaces, the sides of the modillions and coffers of the soffit should tend towards the centre of the curve, as in the Pantheon, at Rome; but, when the concave is small, it will be far the better way to direct them towards the opposite point in the circumference, that the contraction may be the less perceptible, and the parts dependent thereon suffer less deviation from their natural form. The same rules must also be observed with regard to dentils, to the abacus. and bases of columns and pilasters, and likewise to the flanks of the pilaster itself. But, on convex surfaces, the sides of all these should be parallel to each other, for it would be very unnatural, and extremely disagreeable, to observe them narrowest where they spring out of the cornice, and diverging as they advance forwards, forming sharp angles and a sort of mutilated triangular plan, with enlarged solids, and diminished intervals, each calculated to destroy the usual proportions and beauty of the composition.

The entablature to the Corinthian order may be reduced to two-ninths, or one-fifth of the height of the column, by the same rules as are given in the Ionic and Composite orders: but, where it is rendered necessary, or it is deemed expedient, to make the entablature so small as one-fifth, it will be best to substitute the Ionic

entablature, as Palladio has done in the peristyle of his Olympic Theatre, at Vicenza, and in several of his buildings; or else to retrench the dentils of the cornice, as in one of Serlio's, and in Scamozzi's profiles, the part of the cornice under the modillion band remaining then composed of only the ovolo and ogee, separated by a fillet, as in the several temples mentioned in Palladio's fourth book.

REFERENCES TO THE SEVERAL PLATES ON THE PRACTICE OF THE CORINTHIAN ORDER.

ORDERS, PLATE VIII.—*Fig.* 1. Represents, on an enlarged scale, the entablature and capital of the Roman Corinthian order, proportioned by modules and minutes in manner before described by Sir William Chambers.

Fig. 2.—Represents the attic base and part of the column, proportioned in a similar manner to the preceding.

Fig. 3.—The antique Corinthian base.

Fig. 4.—An oblique profile of the capital, showing the projection of the leaves, by a line drawn from the astragal to the extreme of the volute.

Fig. 5.—Semi plan of the capital, showing the number and arrangement of the leaves, as likewise the segmental curves forming the outlines of the capital.

Fig. 6.—Plan of the soffit of the entablature, shewing the modillions, and the manner of finishing the soffit at the angles.

ORDERS, PLATE X.—*Fig.* 1. A Roman Corinthian capital, from actual measurement, copied from the Temple of Vesta, at Tivoli.

Fig. 2.—Section or profile of the annexed capital.

Fig. 3.—Plan of the several parts of the above capital and base.

Fig. 4.—Elevation of the base and part of the cornice of the pedestal on which the order stands.

ORDERS, PLATE XXIII.—*Fig.* 1. A Grecian antique Corinthian capital appertaining to a column.

Fig. 2.—Profile of the before-mentioned capital.

Fig. 3.—Grecian Corinthian antique capital to an antæ.

Fig. 4.—Profile also of the last mentioned capital appertaining to the same.

ORDERS, PLATE XXIV.—*Fig.* 1. Grecian antique base to a Corinthian antæ.

Fig. 2.—Grecian Corinthian capital to an antæ.

Fig. 3.—Grecian antique base to a Corinthian antæ.

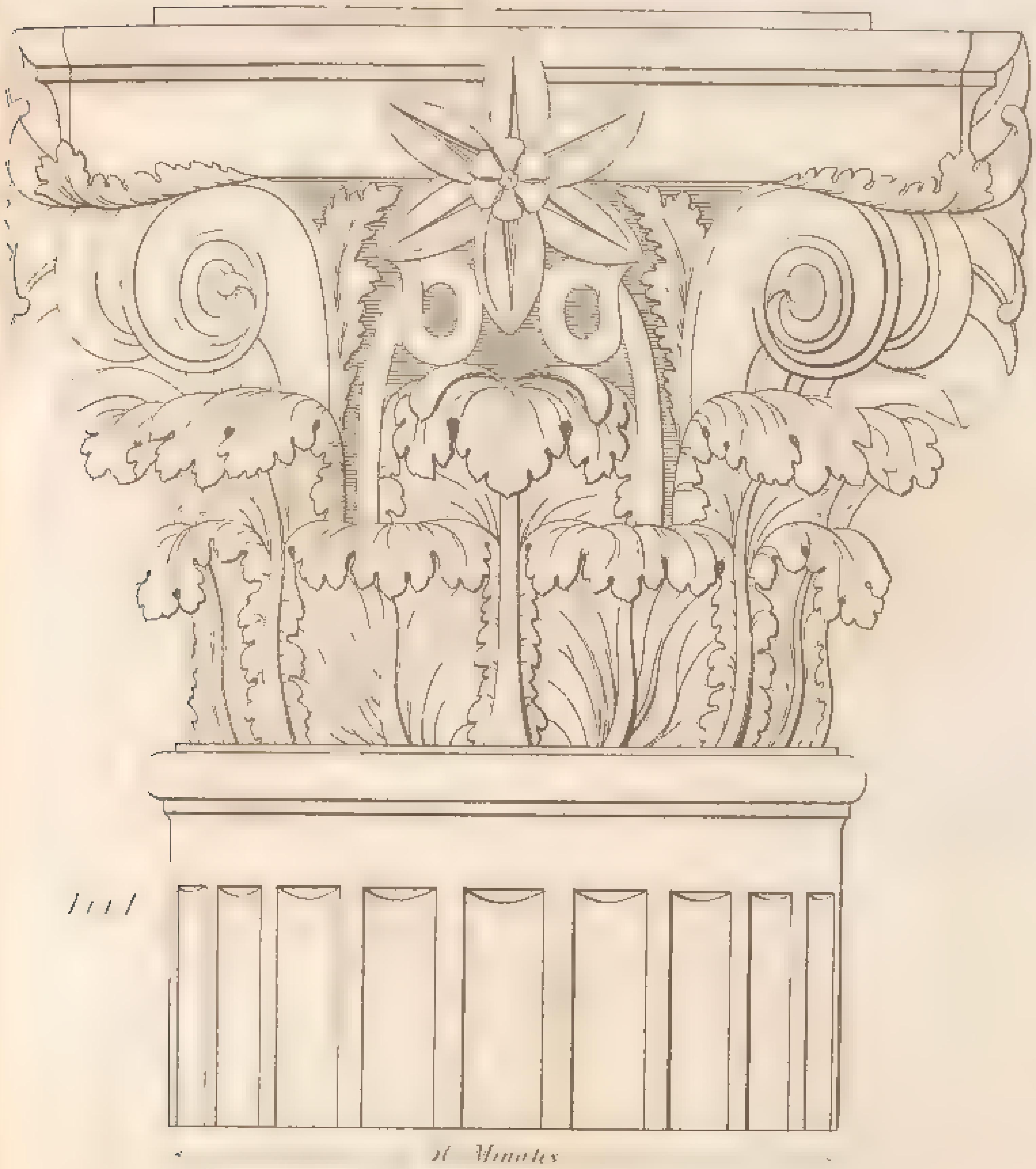
ORDERS

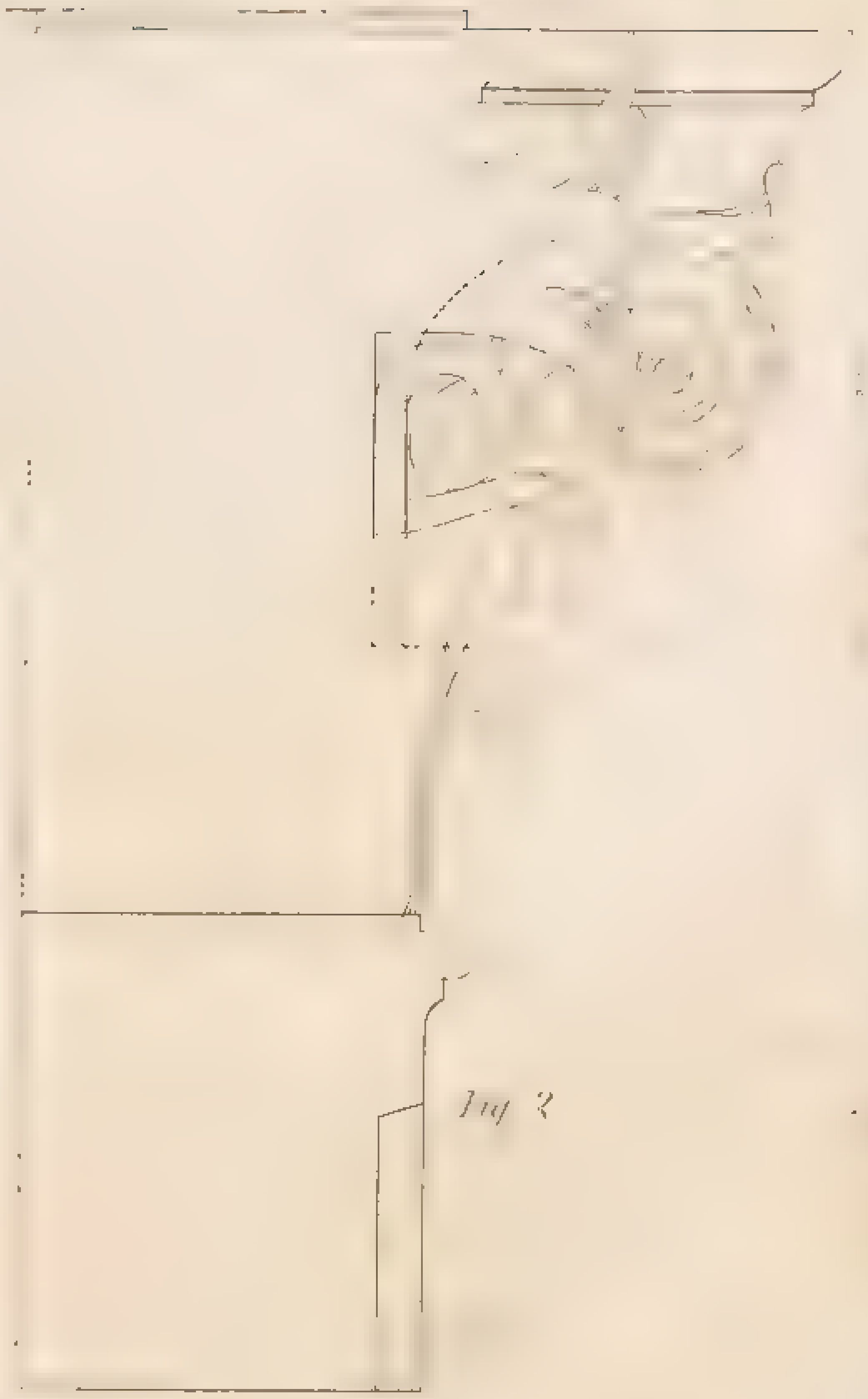
PLATE VIII.

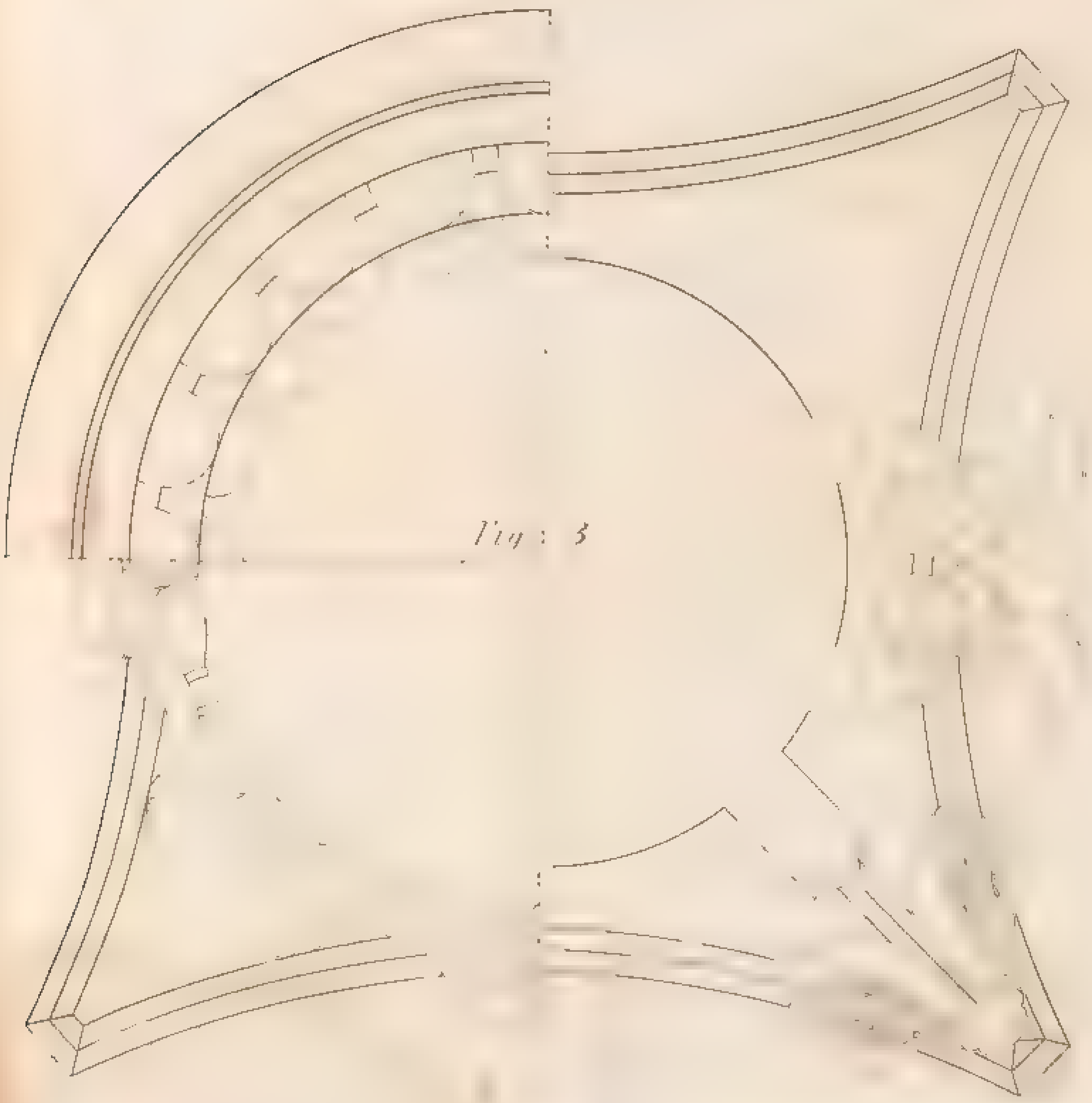
ROMAN CORINTHIAN ORDER.

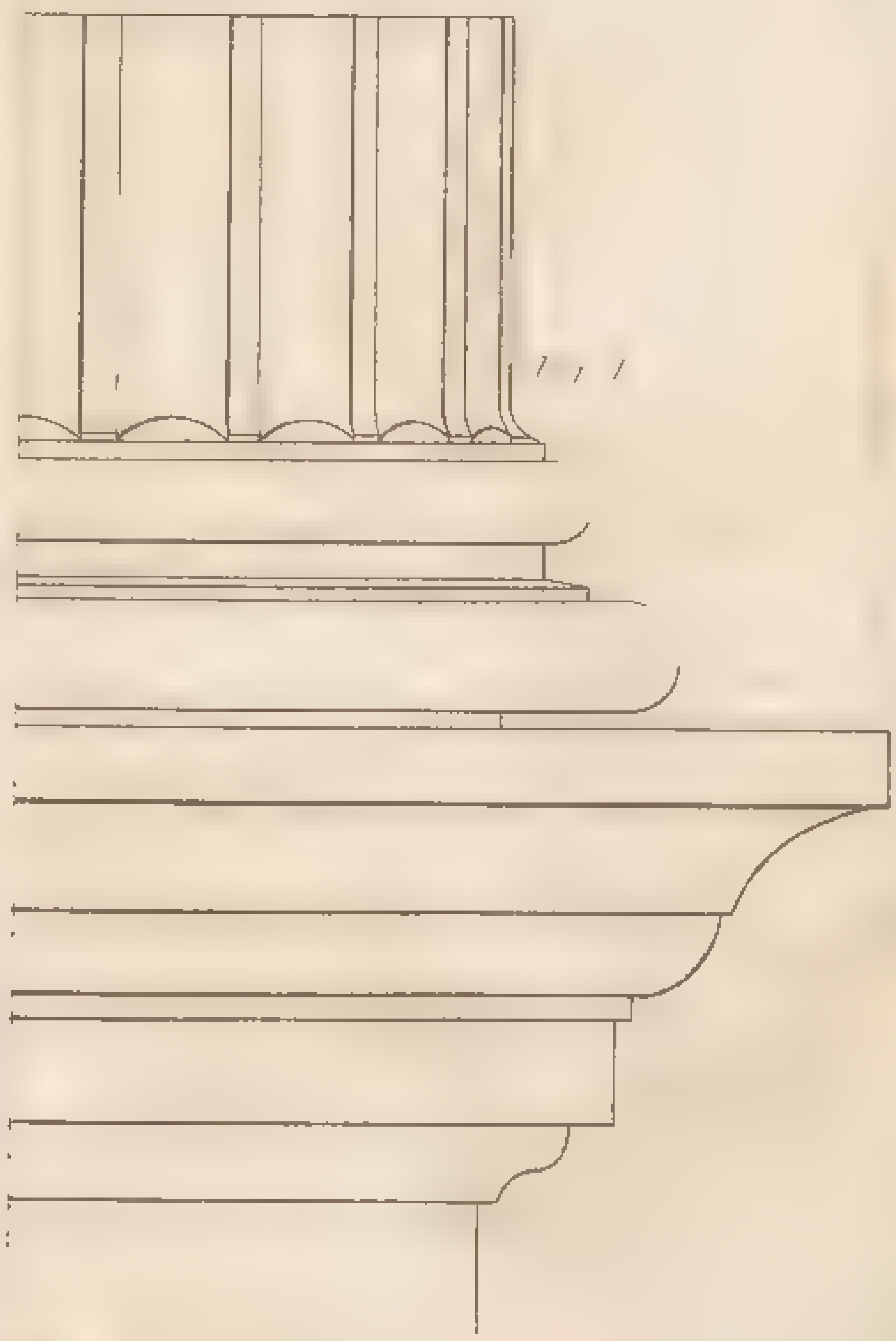
R. Elsam, Arch.t direx.t

THE CORINTHIAN CAPITAL & BASE FROM THE TEMPLE OF TIVOLI









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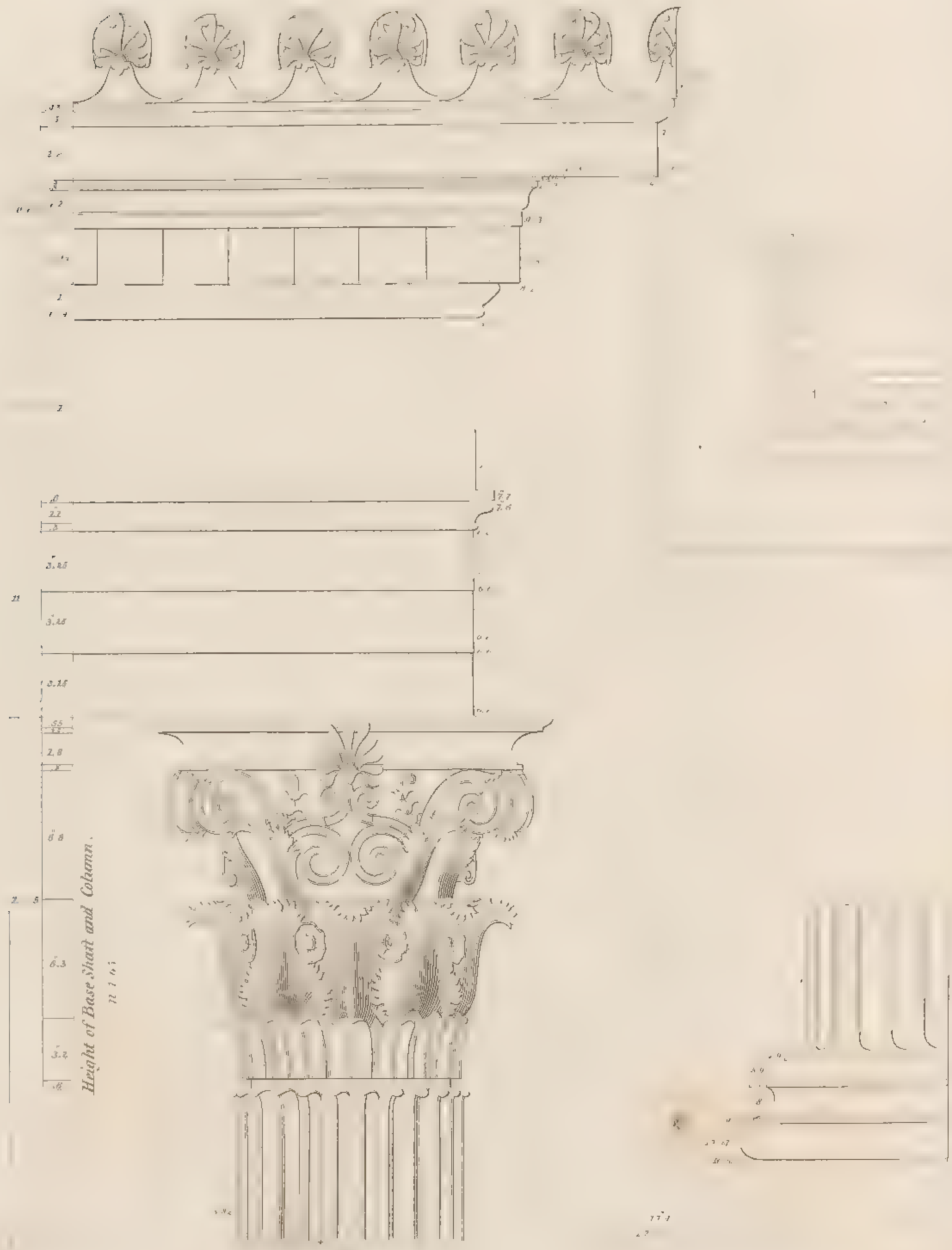
GRECIAN CORINTHIAN CAPITALS & [illegible] PILASTERS OR ANTÆ.

FROM THE CHORAGIC MONUMENT OF LYSICRATES.



Drawn by M. A. Nicholson

Engraved by W. Symns

London, Published by Thos Kelly, 17 Paternoster Row, November 1. 1824.

Fig. 4.—Grecian Corinthian capital to an antæ.

Fig. 5.—Profile of the preceding capital.

Fig. 6.—The base to the Grecian Corinthian pilaster, or antæ appertaining to the latter.

ORDERS, PLATE XXV.—*Fig.* 1. The entablature and capital of the Grecian Corinthian order, imitated from the Choragic Monument of Lysicrates, commonly called the Lantern of Demosthenes.

Fig. 2.—Is a representation of half the base proportioned, as in the preceding examples.

Fig. 3.—Plan of the soffit of the entablature, showing the dentils, &c.

THE PRACTICE OF PILASTERS, AND THE GREEK ANTÆ.

COLUMNS differ from pilasters in their plans only; the latter being square or rectangular, whereas the former are round.

Pilasters, when accompanied by columns in the Roman style, have their bases, capitals, and entablatures, the same as the columns, and their component parts are all of similar heights and projections: and, when complete, they are identified by the names of *Tuscan, Doric, Ionic, Composite,* and *Corinthian, Pilasters.**

Of the two opposite compositions, says Chambers, the column is, without any doubt, the most perfect as well as the most beautiful. Nevertheless, it would be impossible for composers in architecture to dispense with pilasters; and upon most, and if not upon all, occasions they may be employed with fitness and great propriety. In numerous instances, on various accounts, they are even preferable to columns.

Pilasters are stated to be of Roman invention; and, doubtless, the composition of them is an improvement upon the Greeks, who, instead of them, employed what is called the *antæ;* and, says Mr. Joseph Gwilt, very justly, one of the most objectionable practices of the day is, the servile imitation of this Greek antæ. It is, adds he, quite inconsistent with any regard to primitive types, from which the Grecian architecture is supposed to have originated. Added to this, their application in such very thin laminæ against the walls, as could be pointed to in

* The reader is referred to the following Plates of *Orders,* for various examples of pilasters and the Greek antæ, Plates XIII, XIV, XX, XXIV.

some *pseudo-Grecian* buildings about the metropolis, produces a remarkably silly and unmeaning effect.

The Greeks employed these antæ in their temples, to receive the architraves where they entered upon the walls of the building; and in most, if not in all, of the examples of the antique, the front of the antæ is equal in diameter to the upper one of the adjacent column; the antæ being also of the same width at the top as at the bottom, and not diminished as in the Roman examples of pilasters. And these antæ, now so much the fashion in the metropolis, are executed, in imitation of the originals, equal in one direction to the diameter of the column in front; but, in flank, extravagantly thin in proportion to their heights, and neither their bases nor capitals bear any resemblance to those of the columns they accompany, and, it is supposed, in reference to the Greeks, that the Roman architects, being disgusted with the poor meagre aspect of these antæ, and the want of accordance in their bases and capitals, substituted *pilasters* in lieu of them; which, being proportioned and decorated in a similar manner with the columns, are, in the eyes of the most thinking and unprejudiced persons, more fitting, applicable, and seemly, as tending at once to preserve the unity and harmonious effects of all manner of architectural compositions wherein Columns and Pilasters accompany each other.

The compilers of this work are perfectly aware of the strong prejudice in favour of Grecian examples of every sort; nevertheless, they conceive it their duty to advise the juvenile student against the adoption of whatever appears to be not only inconsistent with, but repugnant to, *good taste.*

Several authors, says Chambers, are of different opinions about pilasters and their application, and to the end of the world such differences will exist in the minds of scientific men upon points of taste. A French Jesuit, says the same intelligent writer, many years ago, published an Essay on Architecture, which, from its plausibility, force, and elegance of diction, went through several editions, and operated very powerfully on the superficial part of European connoisseurs. The Abbe Laugier, who, it is understood, is the author adverted to, inveighs in the strongest terms against pilasters, and against every other architectonic form, excepting such as were imitated by the first builders in stone, from the primitive wooden huts: as if, in the entire catalogue of arts, architecture should be the only one confined to its pristine simplicity, and debarred from any deviation or improvement whatever.

To pilasters the learned father objects, because they are, in his opinion, nothing better than bad representations of columns. Their angles, says he, indicate the formal stiffness of art, and are a striking deviation from the simplicity of nature; their projections, sharp and inconvenient, offend and confine the eye; and their surfaces, without roundness, give to the entire order a tame insipid effect; they are not, as he thinks, susceptible of diminution, one of the most pleasing properties of columns: and, in his opinion, they never can be necessary. To sum up the whole, "he hates them; his aversion was first innate, but it has been subsequently confirmed by the study of architecture."

Now, as regards the reverend father's inborn aversion, much need not be said; and as to the several other objections, as they consist more of words than meaning, on that account they seem not to require argumentative refutation: conviction on the face of his own showing is too evident. To assert that pilasters are not susceptible of diminution, at once discovers very little acquaintance either with books of architecture or with buildings. Innumerable are the instances, in the remains of antiquity, of their being diminished; and, in particular, when associated with columns. They are so in the Temple of Mars the avenger, in the Frontispiece of Nero, in the Portico of Septimus Severus, and in the Arch of Constantine, at Rome. Scamozzi always gave to his pilasters the same diminution as to his columns; Palladio has diminished them in all his buildings at Venice; and Inigo Jones has likewise done the same in many of his designs, and in particular at Whitehall.

And if we trace back to the origin, and consider pilasters either as the representation of the ends of partition-walls, or trunks of trees reduced to the diameter of the round trunks, but left square for greater strength, the reason for diminishing them will, in either case, be manifest.

It is, also, a strange error to suppose, or to assert, that pilasters are never necessary; but that columns will, at all times, answer the same purpose: for, at the angles of most architectural fronts to buildings they are indispensably necessary, both for solidity and beauty. For the angular support, having a greater weight to bear than any of the rest, they should be so much the stronger, so that its diameter must be encreased, or its plan altered, from the circle to the square. The last is certainly the most reasonable expedient; but, chiefly so, as it obviates a very striking defect, occasioned by employing columns at the angles of build-

ings; which is, that the angle of the entablature is left, as it were, apparently suspended in the air without any apparent support; a sight very painful and disagreeable in many oblique points of view, and at the same time very unsolid.

It is customary in most, if not on all, occasions, to porticos and other detached compositions, to employ columns at the angles; and it is extremely judicious so to do: for, of defects such as those described the least should be preferred; and although, says Chambers, the reverend Father Laugier, whose objections have been cited, could not see any reason for rejecting detached pilasters when engaged ones are permitted, yet a very substantial reason may be assigned, which is, that detached pilasters, in certain oblique views, appear thicker than they do in front, and nearly in the ratio of seven to five; but, of course, when seen in front, they will appear well-proportioned; yet, with respect to the columns they accompany, they never can appear so when viewed upon the angle; as may be observed in the colonnades at Burlington-House, in Piccadilly, London; and in the portico of Saint George's, Hanover Square; as well as in the extraordinary *applique* to the front of the new theatre in Drury Lane.

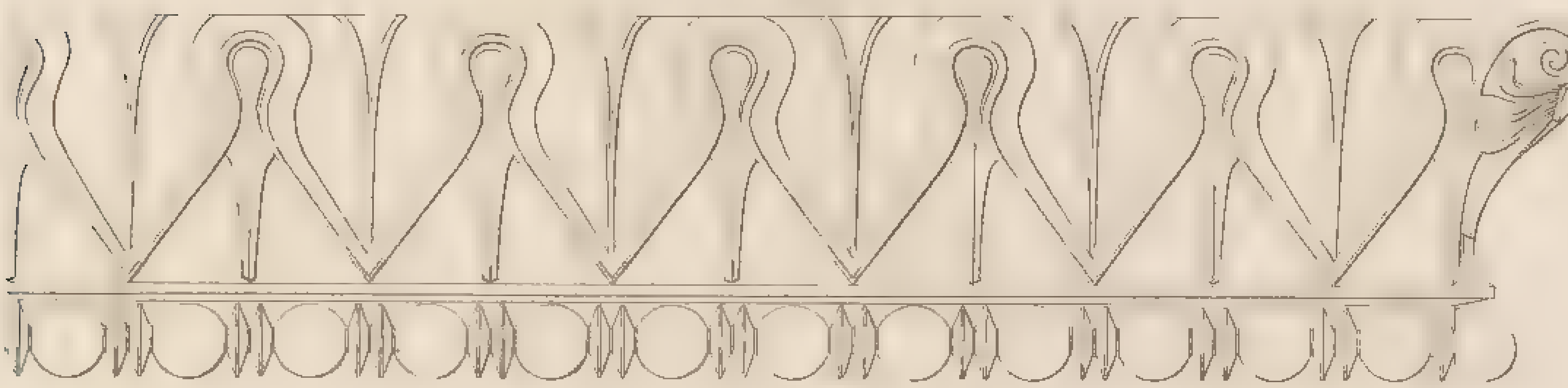
Engaged pilasters may be employed, and appositely, in churches, galleries, halls, and in other exterior decorations, to save room; for, as they seldom project more than one quarter of their diameters, they will not occupy near so much room as attached three-quarter columns. Pilasters are also frequently introduced, with great propriety, in exterior decorations; and, very frequently, to avoid superfluous expense. The effects of this may be observed in many of the splendid mansions of the nobility in the metropolis, and in many other towns; at other times pilasters accompany columns, being placed beyond them, to support the springing of the architraves, as in the Corinthian portico of Saint Martin's Church, London, in which instance the pilasters are continued all round the building, and in the intervals between the several loggia porticos, as well as from the latter, up to the grand portico in front, allowed to be the most perfect of the description in the British Metropolis. Blondel also says, that pilasters may likewise be employed instead of columns, to form porticos; but, among the Roman antiques, examples of this sort are not to be found. The Choragic Monument of Trysallus, at the foot of the Acropolis, may, however, be considered as a Grecian example, a fac-simile of which, as regards proportions, may be seen at the entrance to the Rev. Mr. Belsham's chapel, in Essex Street, leading from the Strand.

GRECIAN ORNAMENTS.

Fig. 1.

Fig. 2.

Fig. 3



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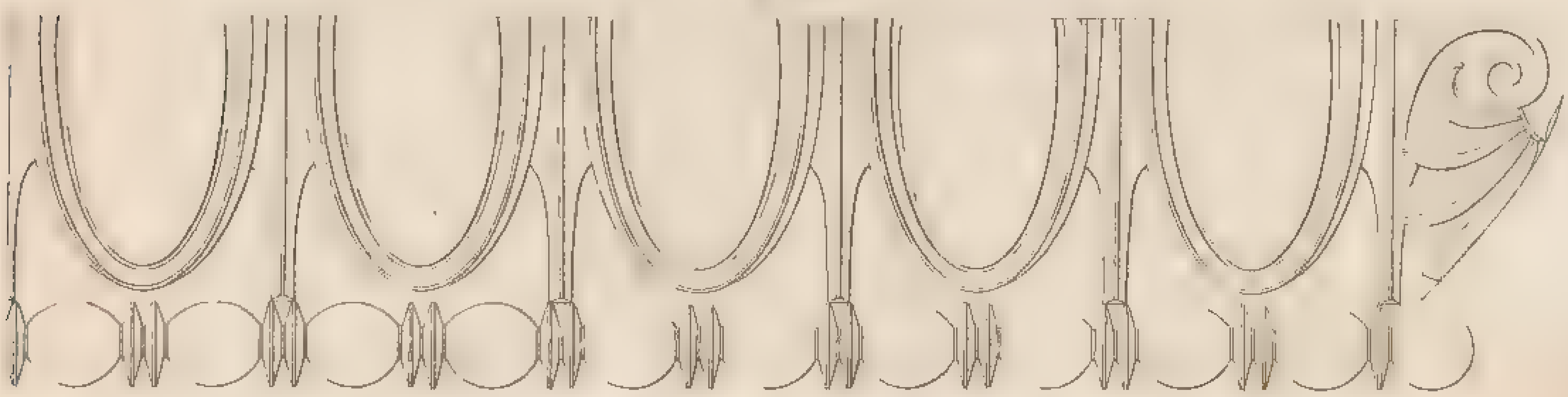

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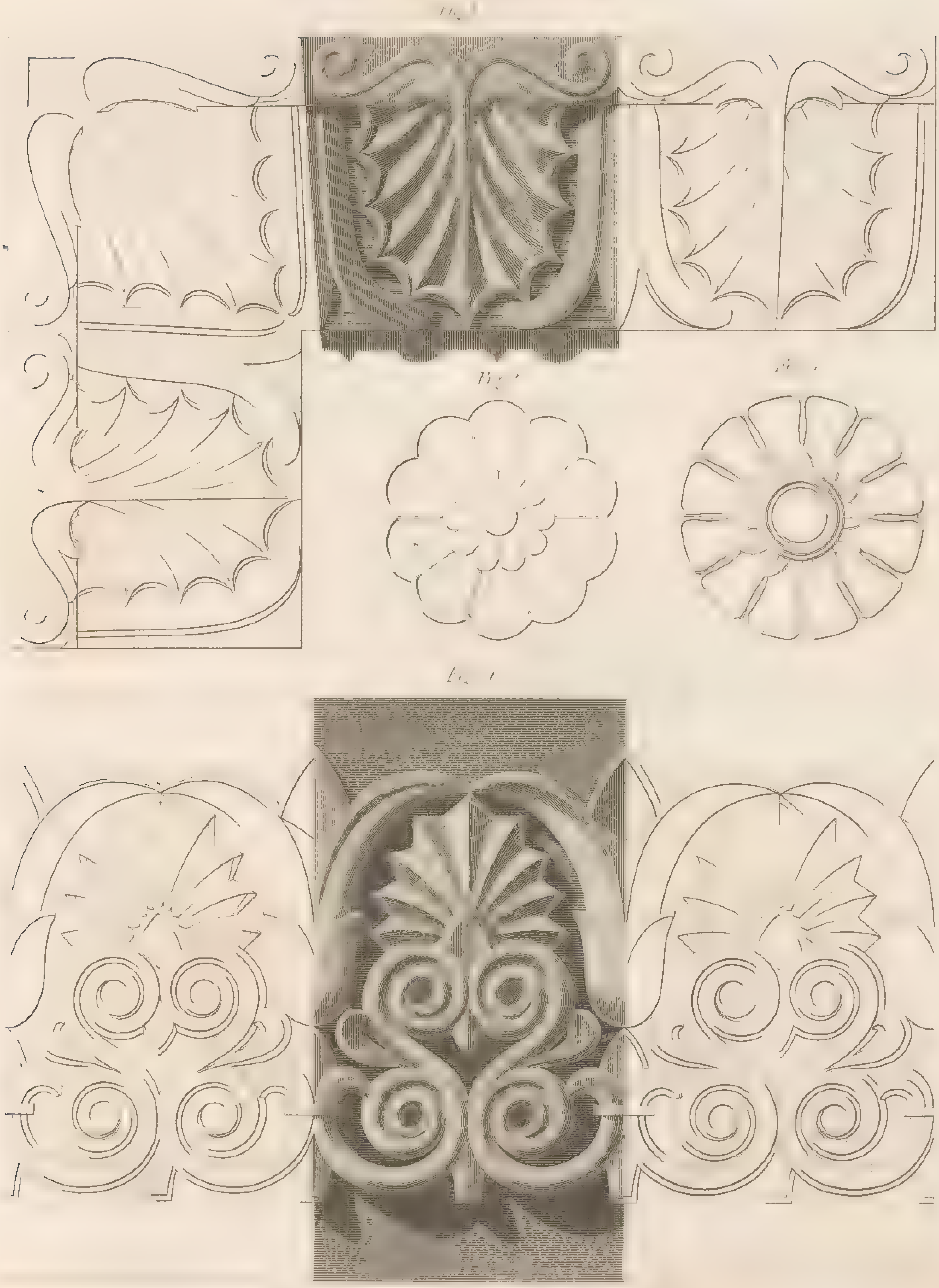
London, Published by Tho.s Kelly, 17 Paternoster Row, June 5th 1824.

GRECIAN ORNAMENTS.



GRECIAN AND ROMAN ORNAMENTS.

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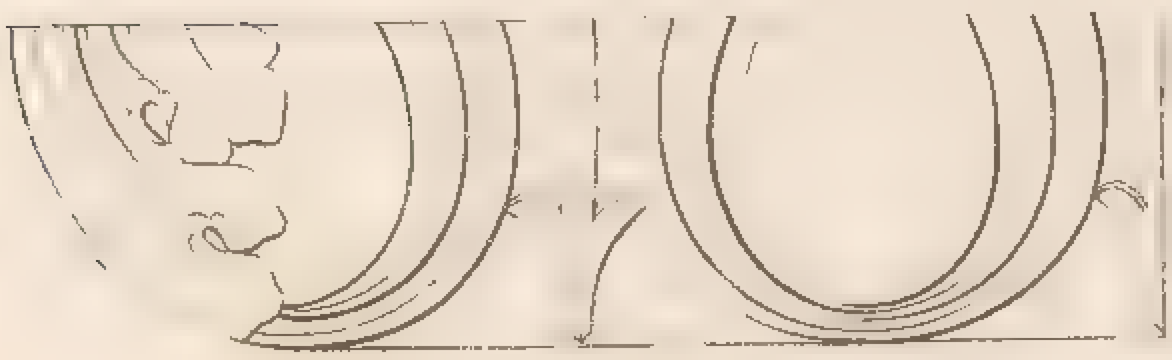

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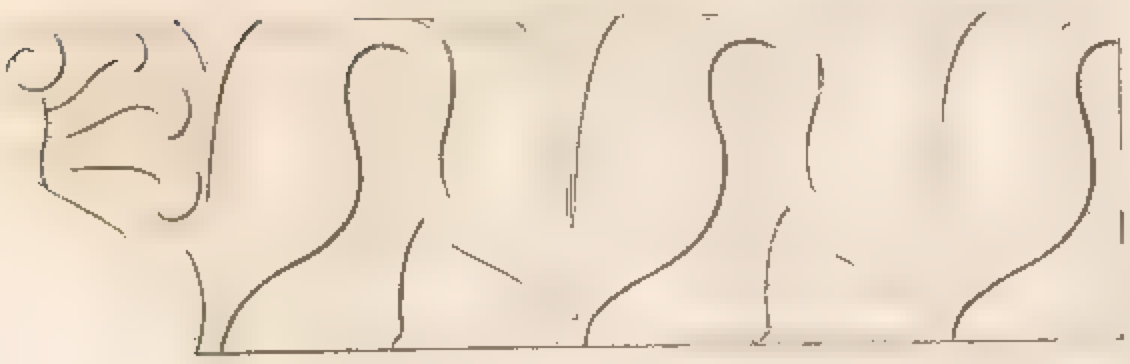

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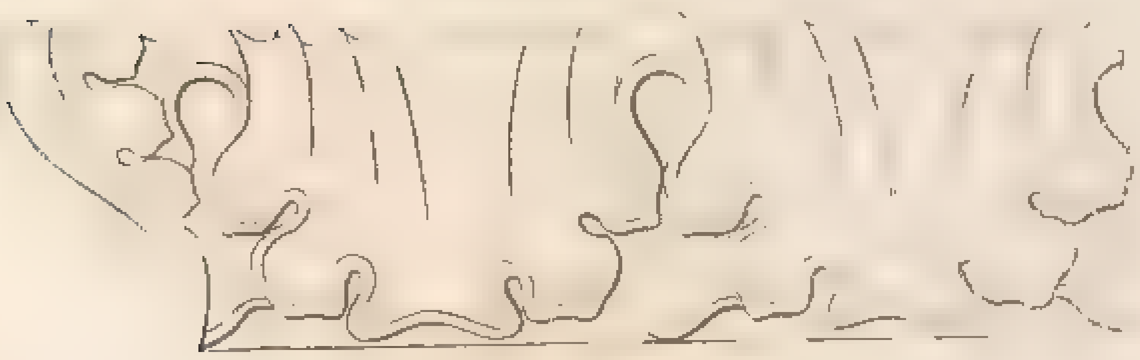

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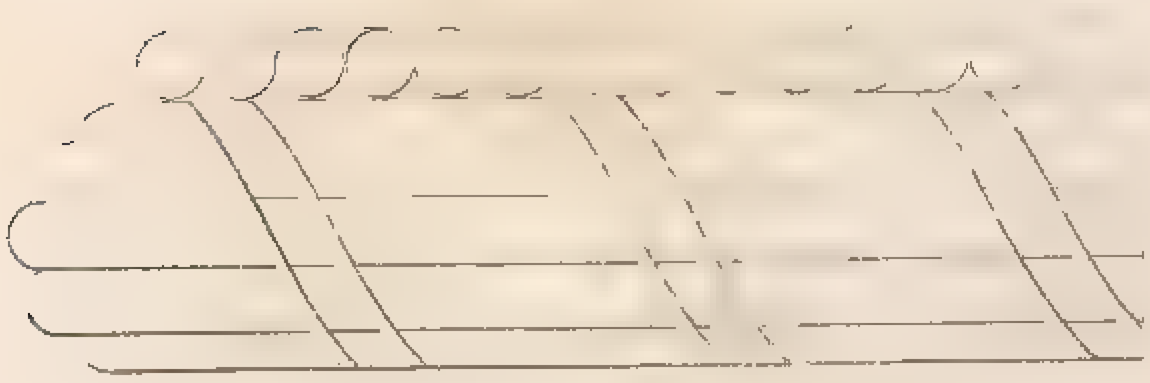

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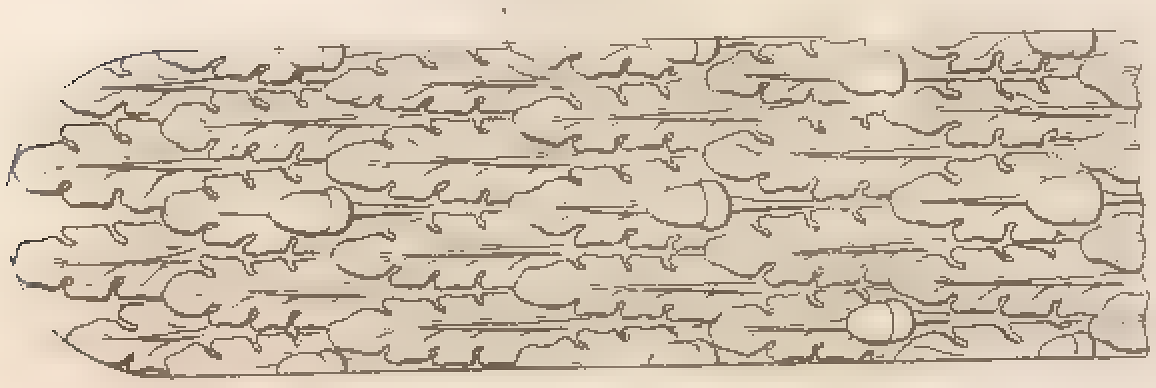

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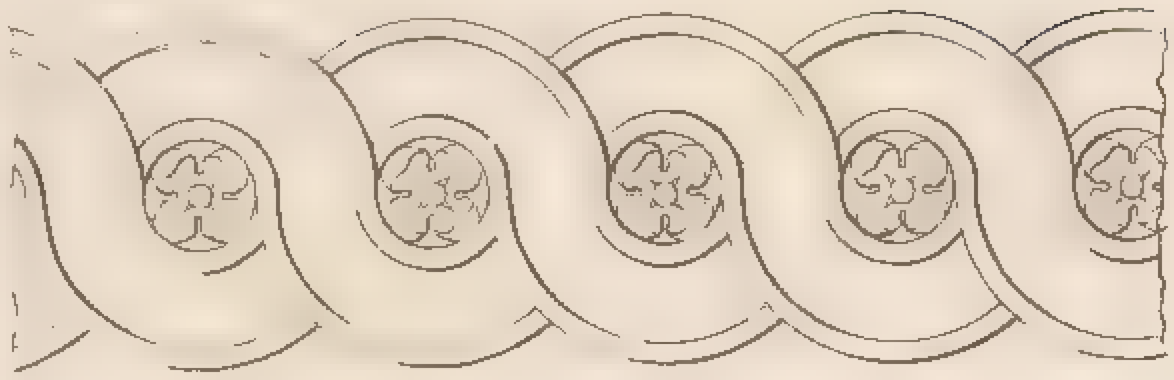

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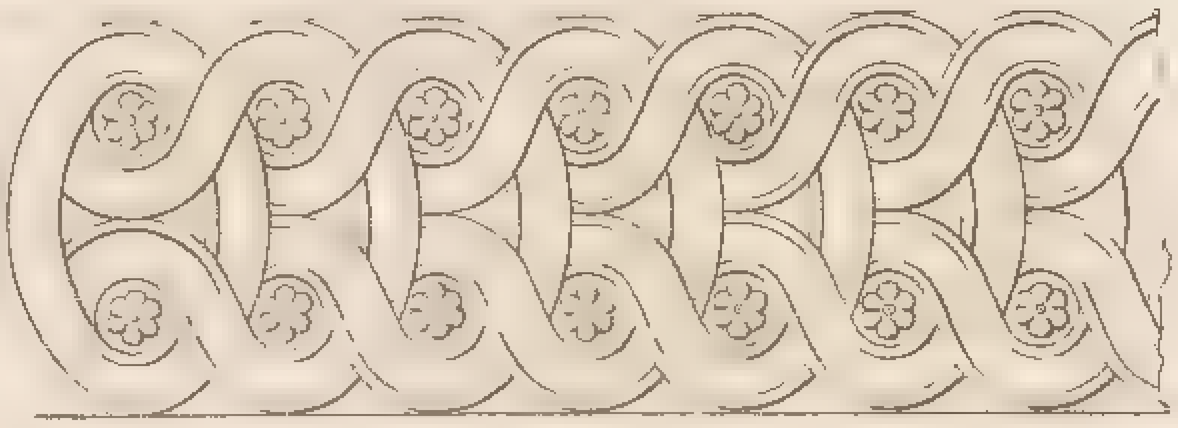

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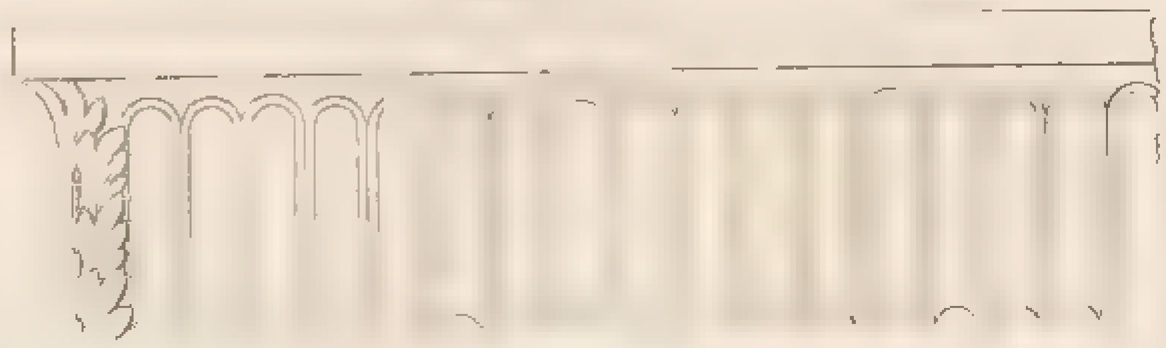

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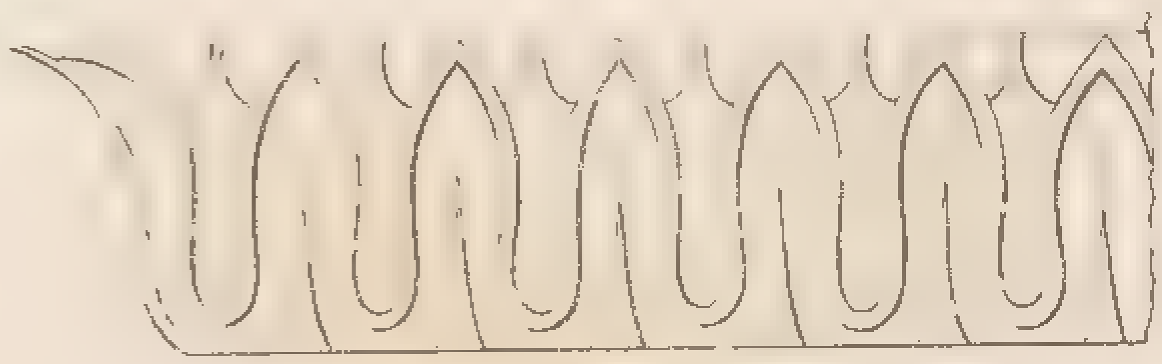

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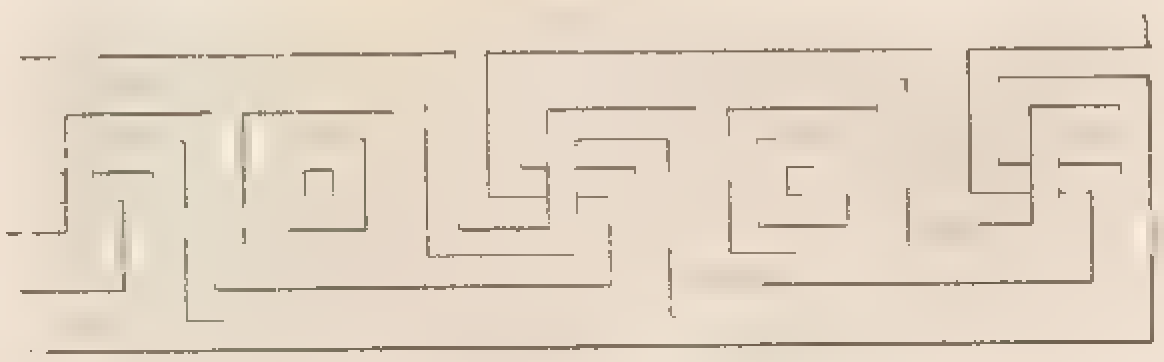

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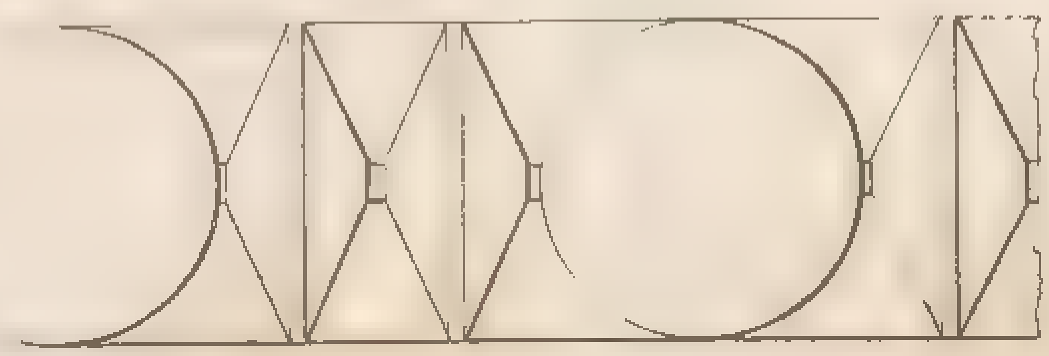


FRETS.

Fig. 1.

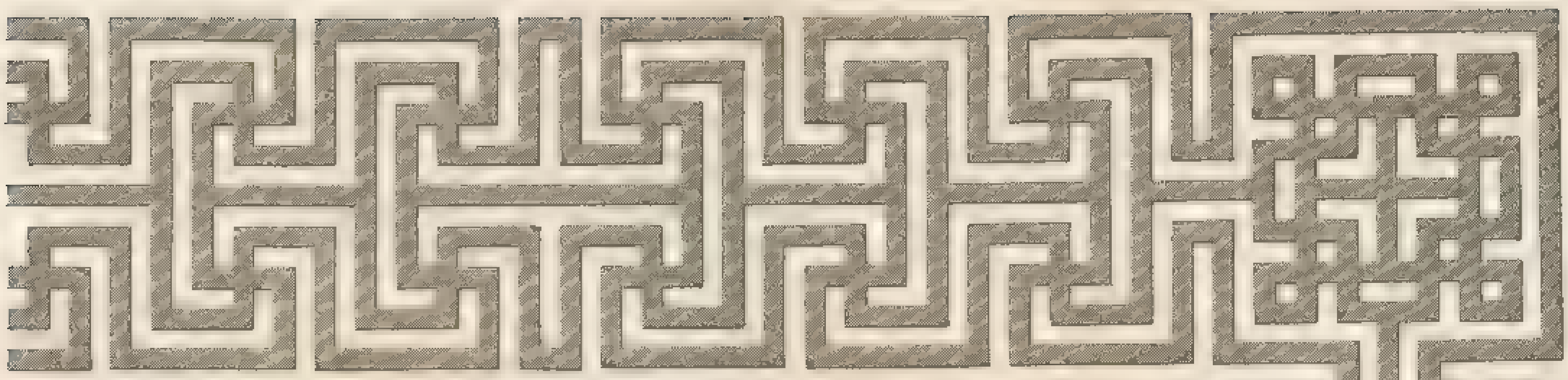


Fig. 2.

Fig. 3.

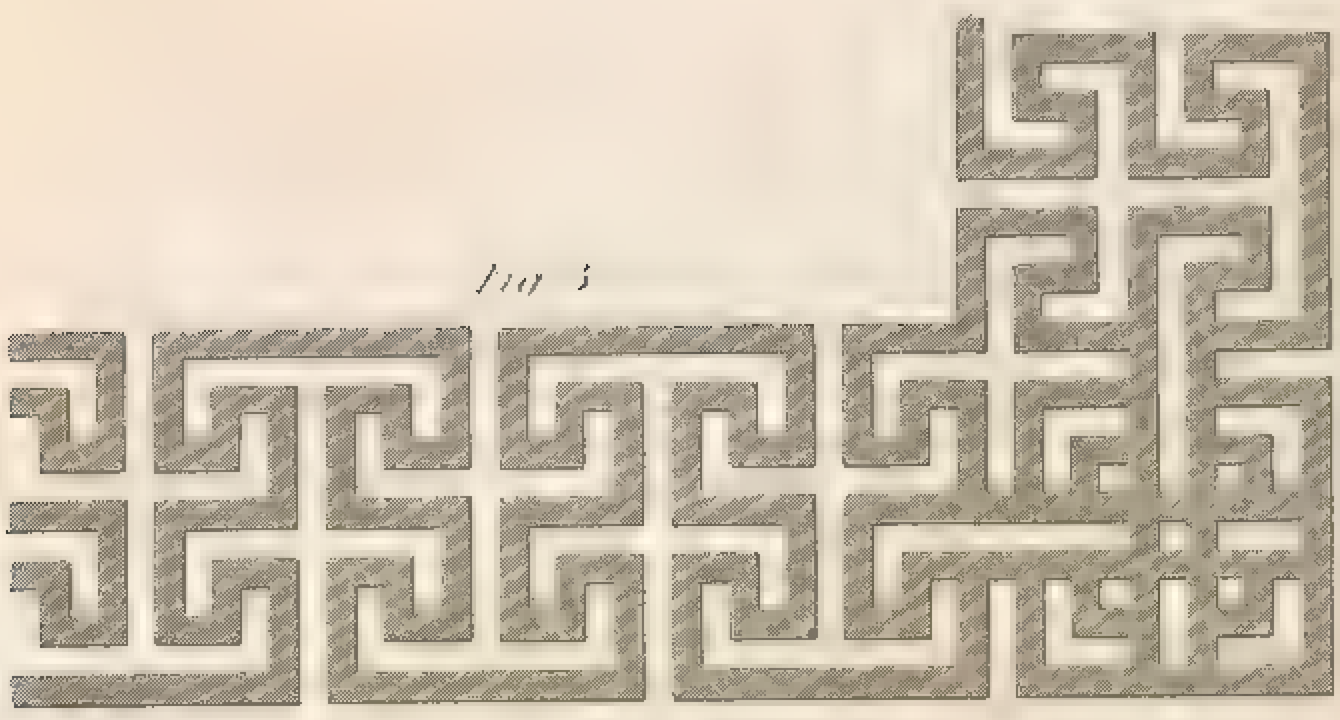
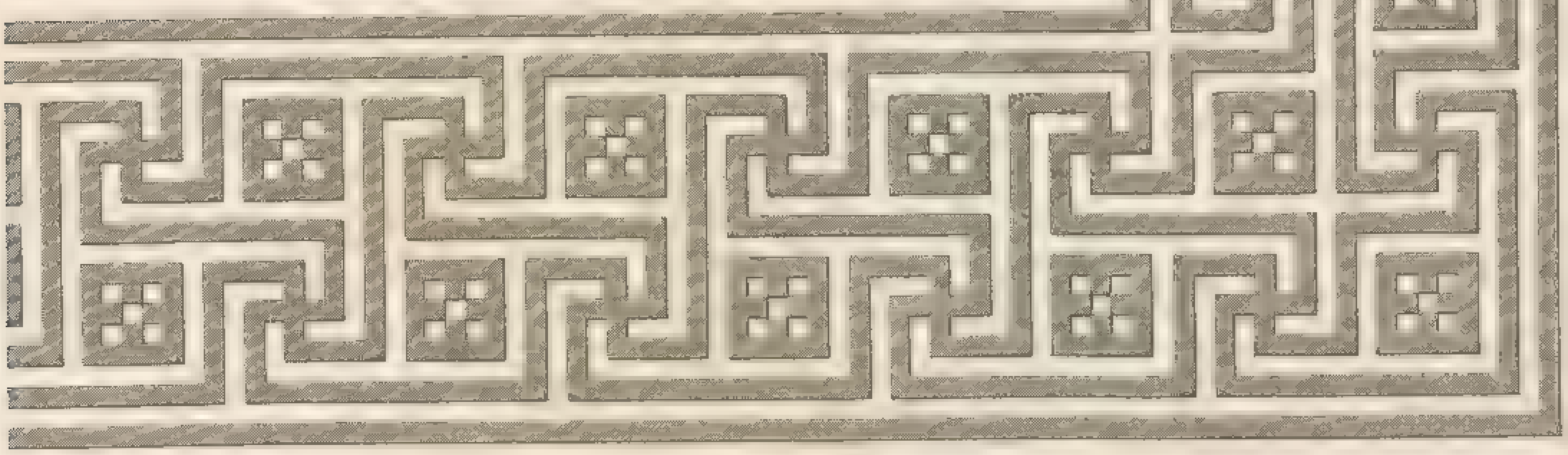


Fig. 4.



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[illegible] 1824

The proportions of the monument adverted to are very much and justly admired; but, as regards the square detached pillar, or pilaster, in the centre, it cannot receive the approbation of scientific men when applied as a portico round an entrance, the aperture of which is in the centre of the portico *applique*.

When pilasters are introduced as chief ornaments in compositions, they should always project at least one quarter of their diameters beyond the walls, as Scamozzi teaches, and as they have been executed by Inigo Jones, at Whitehall; which projection produces that degree of boldness requisite in buildings of a certain standard, and in the Corinthian and Composite orders is also more regular: and, because the stems of the volutes, and the small leaves in flank of the capital are then cut exactly through their centres. But, if the cornices of the windows should be continued in the inter-pilasters, which is sometimes the case; or, if there should be cornices to mark the separations between the principal and second stories, as at the Mansion House, in London; or large imposts of arches, the projections must then, and in such cases, be increased; provided they are not sufficient to stop the most prominent parts of such decorations, it being extremely offensive to the judicious to see several of the uppermost mouldings of an impost or cornice cut away perpendicularly, in order to make room for the pilaster, while the cornice or impost on each side projects considerably beyond it; as is the case in many public buildings of great notoriety. Mutilations should, on all occasions, be studiously avoided, as being destructive of perfection, and strong indications either of inattention or ignorance.

When pilasters are placed behind columns and very near to them, they should not project above one-eighth of their diameter, or even less, unless there should be imposts, or continued cornices, in the inter-pilasters; in which case, whatever has been before observed must be particularly attended to. Where flutings are required to the shafts of pilasters, the same proportions should be followed as in the same ornaments to columns.

ON THE

ANTIENT ARCHITECTURE OF GREAT BRITAIN,

RECOGNIZED AS

THE GOTHIC, SAXON, AND NORMAN MODES OF BUILDING.

To those usually called Gothic architects, says Chambers, we are indebted for the first considerable improvements in construction; there is a lightness in their works, an art and boldness of execution, to which the antient Greeks and Romans never arrived, and which the moderns, we may almost venture to say, until within the last thirty years, did not much comprehend. England contains many magnificent examples in buildings of this species of architecture, equally admirable for the art with which they are built, the taste and ingenuity with which they are composed. And, says Mr. Gwilt, with equal pungency, there is more constructive skill shown in Salisbury and other of our cathedrals, than in all the works of the antient Grecian and Roman architects put together. The balance of the thrusts of the different arches, the adjustments of thickness in the vaultings, and the exceeding small ratio of the points of support in those buildings to their whole superficies; and, added to these, the consequent lightness and elegance of form which they exhibit, leave us not any thing to desire.

We cannot, therefore, refrain from wishing, with the authors quoted, that Gothic structures were more considered, better understood, and in higher estimation, than they seem to have been in the last century. If as much pains had been taken fifty years since to publish the antiquities of England, as the gleanings of Greece, the architects of our country would have been, at the present crisis, as well informed on the subject of English architecture, as they are at the present

time with Grecian and Roman principles. Let, says Chambers, our antiquaries, alluding to the Society of Diletanti, encourage persons duly qualified to undertake a correct elegant publication of our cathedrals, and other buildings called Gothic, before they totally fall to ruin.* It would be, says he, a real service to the arts of design; preserve the remembrance of an extraordinary style of building, now sinking fast into oblivion; and, at the same time, publish to the world the riches of Great Britain and Ireland, in the splendour of their antient structures. It is true, that since the third edition of Sir William Chambers's valuable Treatise on Civil Architecture, published about thirty-five years ago, this desideratum has been in a great measure accomplished by Mr. John Britton, F. S. A., the author of "The Antiquities of Great Britain." The indefatigable exertions of this gentleman, and the care with which he has endeavoured to perpetuate, by his works, the remains of our antient architecture, entitle him to the gratitude of every lover of the Fine Arts. The descriptions and delineations of the cathedrals, now in course of publication, are of the highest class. That which, perhaps, would have been done in other countries at the expense of the nation, this enterprising and intelligent antiquarian has nearly completed at his own risk, and in the most judicious as well as elegant manner.

To Mr. Augustus Pugin, also, an eminent French architect, who has been upwards of thirty years a resident amongst us in this country, we are greatly indebted. The last work published by that ingenious, excellent, and worthy artist upon Gothic architecture, will be perused with pleasure, and eagerly sought for by those who are anxious to obtain information at the fountain head.

To Mr. Cottingham, an ingenious architect of the present day, we are also indebted for intelligent plans, elevations, sections, details, and views, of the lady chapel, at Westminster, built at the beginning of the sixteenth century. The work last alluded to contains a variety of useful information, which must prove not only interesting to the practical builder, but also to the architectural world in general. The chapel last mentioned, is commonly known as Henry the Seventh's, and is one of the most elaborate Gothic buildings that ever was performed in this country; and, we believe, cannot be equalled by comparison, or

* Such a work, by the Society, was commenced some years ago, and conducted by the late antiquary, Mr. Carter, but we are not aware of its being completed. Hollar's Views of our Cathedrals were published many years since, but are now very scarce.

assimilated to any other in this kingdom, except King's-College Chapel, Cambridge, the former of which has been lately restored at the expense of the nation.

The Rev. John Milner, D.D. F.S.A., &c., in his "Treatise on the Ecclesiastical Architecture of England," endeavouring to account for its origin, recites Bishop Warburton's, we may say bad, success in the attempt; and which, with due reverence to the name of the bishop, we present to our readers, to show the fertile imagination of the reverend prelate, but without attaching much credence to its authenticity, any more than to the romantic notions in the translations of Vitruvius, about the origin of the Five Orders of Architecture. "When the Goths," says the bishop, "had conquered Spain, and the genial warmth of the climate, and the religion of the old inhabitants had ripened their wits, and inflamed their mistaken piety, both kept in exercise by the neighbourhood of the Saracens, through emulation of their service and aversion to their superstition, they struck out a new species of architecture, unknown to Greece and Rome. For, says he, this northern people having been accustomed, during the gloom of paganism, to worship the Deity in groves, a practice common to all nations, when their new religion required covered edifices, they ingeniously projected to make them resemble groves, as nearly as the distance of architecture would permit, at once indulging their old prejudices and providing for the present conveniences, by a cool receptacle in a sultry climate: and with what skill and success they executed their project, by the assistance of Saracenic architects, whose exotic style of building very luckily suited their purpose, appears from hence, that no attentive observer ever viewed a regular avenue of well-grown trees, intermixing their branches over head, but it presently put him in mind of the long *vista* through a Gothic cathedral," &c. The pleasures of imagination, it would seem, are not less susceptible in the divine than in the poet and the architect; but, where such notions as those recited are indulged with extravagance, at the expense of reason, it is the duty of scientific men to treat such fabulous excursions of fancy as they merit. We should feel pleasure in pursuing the subject, but regret that the limits of our work will not permit us to enter into the history of Saxon, Gothic, and Norman architecture, further than by the preceding general observations, which we hope may tend, in some degree, to the improvement of the scientific world; and if it should be the wish of our friends and

subscribers, this work will be succeeded by a practical treatise on the subject, illustrating the antient architecture of Great Britain, in practical details of Saxon and Gothic doors, windows, battlements, pinnacles, and oriel windows, &c.; at the same time, embracing as much general information as will at once enable the practical architect to design castellated villas and mansions, as well as churches, chapels, and glebe-houses, in their various characteristic modes of building, and in strict conformity with the principles of our antient ecclesiastical architecture, and such other edifices as, in former times, it was the pride of our ancestors to adopt; and which, at the present moment, is rapidly advancing in estimation, under the fostering protection of his present Majesty, whose admiration of British architecture can be only equalled by such ardent feeling as was manifested by our late revered Monarch, George the Third, who, it is presumed, caused, by his Royal patronage and adoption of our national style of building, more castellated mansions, Gothic abbeys, and baronial castles, to be erected in the different parts of the United Kingdom, than can be traced, in former times, throughout the pages of English History. The antient architecture of our country, therefore, being, at the present period, in high estimation, we are of opinion that a work of the description above alluded to must be a *desideratum*, not only to the practical architect, but also to the public at large.

By recent efforts, conducted according to the most approved principles of architecture, the face of our country is daily acquiring new beauty. Taste without use and solidity is, indeed, of little permanent value; but, when combined with truth, it commands, by deserving, universal applause. This, in the present age, is verified by the numerous beautiful edifices rising in all quarters, for the purposes of religion, benevolence, learning, and the enjoyment of mankind; and thus we may justly congratulate our country, that the happy art in building is at length discovered and practised, by combining elegance with convenience, and rendering ornament conducive to accommodation.

CHAPTER XVII.

PERSPECTIVE.

DEFINITIONS.

Def. 1.—Linear Perspective is the art of representing an object on a plane surface in such a manner, that if the eye, the plane, and the object, be duly posited with respect to each other, a straight line drawn from any point in that object to the eye will meet the picture in the corresponding point of the representation.

Def. 2.—The plane surface on which the representation is made, is called the *plane of the picture.*

Def. 3.—The point wherein the eye of the spectator is placed is called the *point of sight.*

Def. 4.—The point where a perpendicular, from the point of sight to the plane of the picture, meets that plane, is called the *centre of the picture.*

Def. 5.—If a plane be supposed to pass through the point of sight, parallel to the plane of the picture, that plane is called the *directing plane.*

Def. 6.—An original point, line, or plane, is a point, line, or plane, referred to the object itself.

Def. 7.—The point where a line from the object, produced, if necessary, meets the picture, is called the *intersecting point* of that line.

Def. 8.—The line in which any original plane meets the picture, is called the *intersecting line* of that plane.

Def. 9.—The point where any original line meets the directing plane, is called the *directing point* of that line.

DEF. 10.—A line joining the point of sight and the directing point of an original line, is called the *director* of that original line.

DEF. 11.—The line where an original plane, or its prolongation, meets the directing plane, is called the *directing line* of that original plane.

DEF. 12.—A line drawn through the point of sight, parallel to any original line, is called the *radial* of that original line.

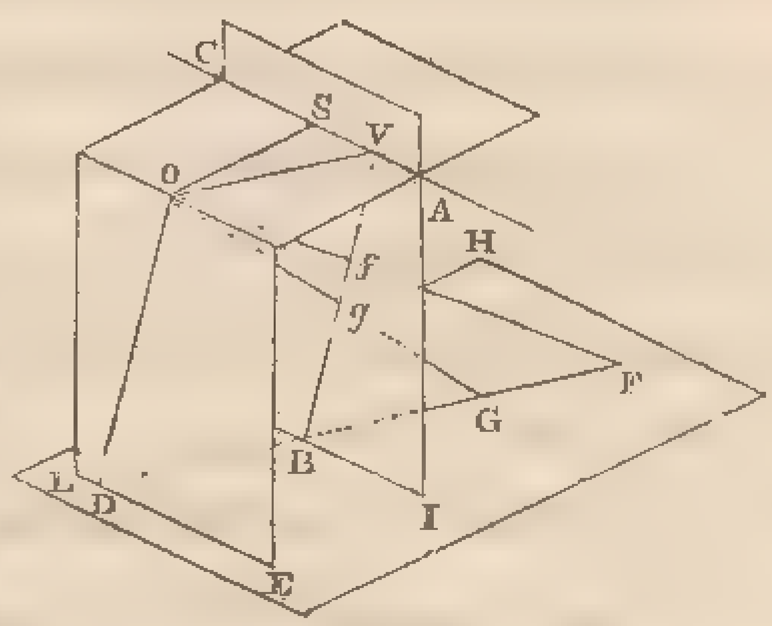
DEF. 13.—A plane passing through the point of sight, parallel to any original plane, is called the *radial* of that original plane.

DEF. 14.—The point wherein the radial of any original line meets the picture, is called the *vanishing point* of that original line.

DEF. 15.—The line where the radial of any original plane meets the picture, is called the *vanishing line* of that original plane.

DEF. 16.—The point where a perpendicular, from the point of sight to a vanishing line, meets that line, is called the *centre* of that vanishing line.

DEF. 17.—The representation of any object is called the *projection* of that object.



In order to comprehend more clearly the meaning of these definitions, imagine the plane, ABC, to represent the plane of the picture (*Def.* 2), O the point of sight (*Def.* 3), the plane ODE the directing plane (*Def.* 5): F and G original points, FG an original line, and FGH an original plane (*Def.* 6): Let the original line, GF, meet the picture in BI, and the directing plane in DE; BI is the intersecting line (*Def.* 8), B is the intersecting point, and D the directing point (*Def.* 9). Again, let OAC be a plane parallel to the original plane, FGH, meeting the picture in the line AC, AC is the vanishing line of the plane FGH (*Def.* 15). If the line OV be parallel to the original line FG, and meet the picture in V, V is the vanishing point of the line FG (*Def.* 14). Let FG produced meet the picture in B, and the directing plane in D, B is the intersecting point of the line FG (*Def.* 7), D the directing point of the same line (*Def.* 9), and OD the director (*Def.* 10.) If OS be perpendicular to AC, meeting AC in S, S is the centre of the vanishing line AC (*Def.* 16).

AXIOMS.

Axiom 1.—The common intersection of two planes is a straight line.

Axiom 2.—If two straight lines meet in a point, or are parallel to each other, a plane may pass through them both.

Axiom 3.—The three sides of a plane triangle are in the same plane.

Axiom 4.—If two straight lines be each intersected by a third, the three lines are in one plane.

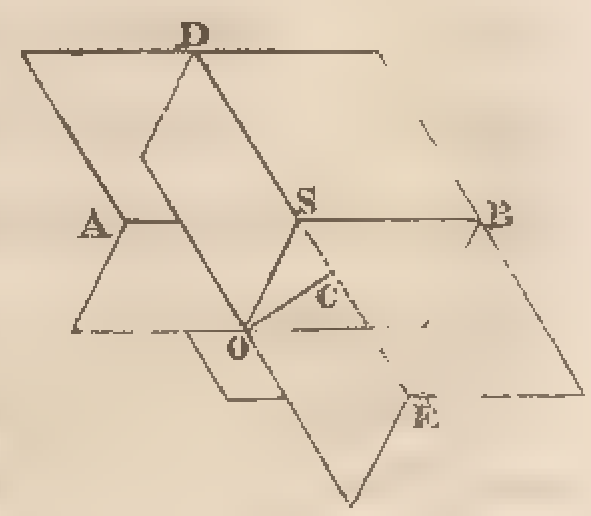
Axiom 5.—Every point in a straight line is in the same plane with that straight line.

LEMMA 1.

If the plane BSO, (see the diagram to *theorem* 1,) meet the plane AEBD, in the line AB, and if from any point O, in the plane BSO, OS be drawn perpendicular to AB, meeting AB in S, if OC be drawn perpendicularly to the plane AEBD and CS joined, CS is perpendicular to AB.

THEOREM I.

A line drawn from the centre of the picture to the centre of the vanishing line, is perpendicular to that vanishing line.



For, imagine AEBD to be the plane of the picture, O the point of the sight, and OSB a plane passing through the vanishing line AB, let S be the centre of the vanishing line, and C the centre of the picture. Then, since OS is drawn perpendicular to AB, and OC to the plane AEBD, meeting A in C, therefore (*Lemma* 1) OS is perpendicular to AB. Q.E.D.

Corollary.—The distance OS, of any vanishing line AB, is the hypothenuse of a right-angled triangle, one leg of which is the distance of the picture OC, and the other the distance, CS, between the centre of the picture and the centre of the vanishing line.

THEOREM II.

The representation of a straight line is a straight line.

For straight lines drawn from any number of points in a straight line, to a point given in position, are all in one plane; and, if this plane be cut by another, the common section of these planes is a straight line.

Therefore, straight lines passing from every point in an original line, to the point of sight, will cut the picture in a straight line.

THEOREM III.

The indefinite representation of a straight line, not parallel to the picture, passes through both its intersecting and vanishing points.

For the intersecting point is the representation of a point in the original line, and the vanishing point the representation of another point in the same line, but the representation of a straight line is a straight line. (*Theorem* II.) Therefore, the line joining the intersecting and vanishing points is a straight line.

Cor. 1.—The representations of all original lines, which are parallel to one another, pass through the same vanishing point, for only one line can be drawn through the point of sight which will be parallel to them all, and that line can generate only one vanishing point.

Cor. 2.—The centre of the picture is the vanishing point of all lines perpendicular to the picture.

THEOREM IV.

The representation of a line parallel to the picture, is parallel to its original.

For, because the line is parallel to the picture, a plane, which is also parallel to the picture, can be drawn through that line: let it be done; and, suppose lines to be drawn from all the points of the original line to the point of sight, these lines will form a plane, which is intersected by two parallel planes; but, when a plane cuts two parallel planes, their common sections are parallel lines; therefore the representation is parallel to the original.

Cor. 1.—The representations of any number of lines parallel to the picture are parallel to one another.

Cor. 2.—The representation of any plane figure, parallel to the picture, is similar to the original; for rays that issue from the original to the eye form a pyramid, of which the picture is a section parallel to the base; but a section of a pyramid, parallel to its base, is similar to the base: therefore, the representation of any plane figure, parallel to the picture, is similar to the original.

THEOREM V.

The representation of a straight line is parallel to its director.

For the plane that passes through the original line and the eye, will intersect both the plane of the picture and the directing plane; but the plane of the picture and the directing plane are parallel to each other. Now, the representation of the original line is the intersection of the plane passing through the original line and the eye, with the plane of the picture; therefore, the representation of the original line is parallel to its director.

Cor. 1.—The representation of all lines that have the same director are parallel to each other.

Cor. 2.—When the original line is parallel to the picture, the director is parallel to the original line.

Cor. 3.—If the director be perpendicular to the directing line, the representations of all original lines, which terminate in the directing point, will be perpendicular to the intersecting line.

Cor. 4.—If the director be perpendicular to the directing line, and the plane of the picture perpendicular to the original plane, then the representations of lines perpendicular to and in the original plane, drawn from the point where the perpendicular meets it, will be in one straight line, perpendicular to the intersecting line.

THEOREM VI.

The vanishing, intersecting, and directing, lines are parallel to each other.

For the directing and intersecting lines, being the sections of parallel planes, are parallel to each other; and, for the same reason, because the vanishing and intersecting lines are the intersections of parallel planes, they are parallel to each other. Therefore, the directing and vanishing lines are both parallel to the intersecting line; but lines, which are parallel to the same line, are parallel to one another: hence the truth of the proposition is manifest.

THEOREM VII.

The vanishing points of all the lines in any original plane are in the vanishing line of that plane.

For, since all the original lines are in the same plane, their radials, which pass through the point of sight, will also be in a parallel plane; but this parallel plane, passing through the point of sight, produces the vanishing line; wherefore all the vanishing points are in the vanishing line.

Cor. 1.—Original parallel planes have the same vanishing line.

Cor. 2.—The vanishing point of the common intersection of two original planes, is the intersection of their vanishing lines.

Cor. 3.—The vanishing line of a plane, perpendicular to the picture, passes through the centre of the picture.

THEOREM VIII.

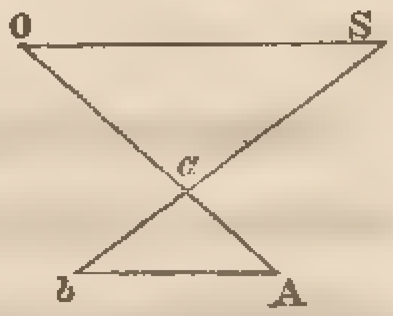
The intersecting points of all lines, in the same original plane, are in the intersecting line of that plane. This is so obvious as to require no demonstration.

Cor. 1.—The intersecting point of the line of common section of two original planes, is the intersecting point of a straight line common to, or in, each plane.

Cor. 2.—Planes which have their common section parallel to the picture, have their intersecting and vanishing lines parallel to each other.

PROBLEM 1.

Given the centre and distance of the picture, with the seat of a point, on the plane of the picture, and the distance of the point from its seat; to find the representation of that point.



Let S be the centre of the picture, and b the seat of the point; draw SO at pleasure equal to the distance of the picture, and let bA be drawn parallel to SO, and equal to the distance of the point from its seat. Join bS and AO; and the point a of intersection is the representation required.

DEMONSTRATION.

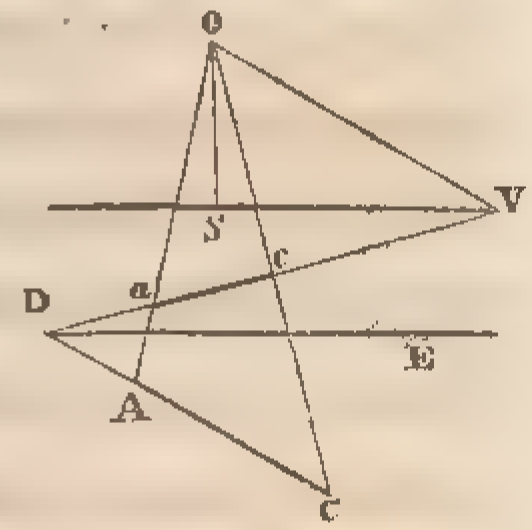
For if the triangle OSb, and, consequently, AbS, had been a right-angle; by turning the triangles SOa and bAa round the line Sb, as an axis, till SO and bA become perpendicular to the picture, O would be the point of sight, and A the original point. AO would be the visual ray, intersecting the picture in a, which would be the representation of the point A (by *Theorem* II); but the point a is the same, whatever be the species of the angle OSb; because the triangles OSa and Aba are similar. Hence Sa : ab :: SO : bA; which proportionality is not affected by any change of magnitude that may take place in the angle OSb; therefore, in all cases, the point a, thus found, is the representation required.

Cor. 1.—Hence $OS + bA : Sa + ab :: Ab : ba$.

Cor. 2.—By this proposition the representation of any line may be found; for having found the representations of any two points in that line, we have only to draw a line through the representations thus found.

PROBLEM 2.

Given the seat of a line, its intersecting point, the angle it makes with its seat, and the centre and distance of the picture; to find the vanishing point and the representation of that line.



Let DE be the seat of the line, D its intersecting point, and S the centre of the picture.

Draw DC, making with DE an angle, equal to that which the original line makes with its seat. Draw SV parallel to to DE, and SO perpendicular to SV, making SO equal to the distance of the picture. Draw OV parallel to DC, meeting SV in V, then will V be the vanishing point, OV its distance from the point of sight, and DV the representation of the line proposed.

DEMONSTRATION.

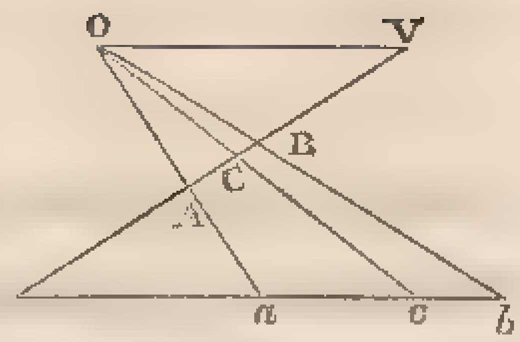
Imagine the planes OVS and CDE to be turned round on the lines SV and DE as axes, till they become perpendicular to the picture; then will O be the point of sight, and DC the original line parallel to OV. V is its vanishing point (*Def.* 14), and, consequently, DV is the indefinite representation. Q.E.D.

Cor.—Conceive DC to be the original line laid on the picture, by turning the plane CDE round the line ED. The representation of any part of it, as AC, may be found, by drawing AO and CO as visual rays, intersecting DV in the points *a c*; as the points *a c* depend only on the parallelism and porportionality of the lines OV and DC.

For $aV : aD :: VO : DA$, and $cV : cD :: VO : DC$. These analogies arising from the similarity of the triangles aVO, aDA; as also cVO and cDC.

PROBLEM 3.

Given the representation of a line and its vanishing point, to find the representation of a point, whose original divides the original line in a given ratio.



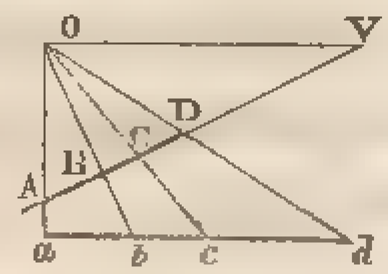
Let AB be the representation of the line whose division is required, and V its vanishing point. Draw, at pleasure, VO, and ba parallel to VO. Through any point, O, in the line VO, draw OA and OB, intersecting ba in a and b. Divide ab in c, in the given ratio, and draw Oc, intersecting AB in C; then will C be the representation required: the original of BC being to the original of CA as bc to ca.

DEMONSTRATION.

OV being parallel to ba, ba may be considered as the original line, and OV as its parallel; and, consequently, O as the point of sight, and aO, bO, cO, as visual rays, generating the points ABC.

PROBLEM 4.

Given the representation and vanishing point of a line, together with a point in that representation, to find another point in the representation, which, with the one given, shall intercept a line, whose original shall have a given ratio to the original of the given representation.



Let AB be the given representation, V its vanishing point, and C the point given, which, with another point to be found, intercepts the required portion of AV.

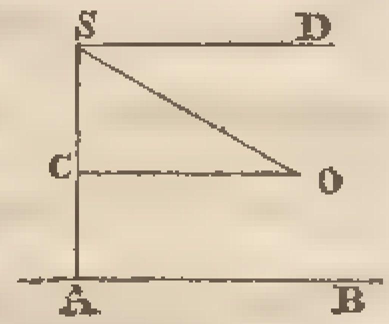
Draw VO, at pleasure, and let ad be drawn parallel thereto. From any point, O in VO, draw OA, OB, OC, meeting ad in the points a, b, and c. Make cd to ab, as the part represented by AB is to the required intercept, and draw Od, cutting AV in D; then will D be the required point. For the original of CD is to the original of AB as cd is to ab.

DEMONSTRATION.

If OV be conceived as the vanishing line of a plane, passing through the original of AV, ad, being parallel to it, may be considered as the representation of a line parallel to the picture (*Cor.* 2, *Theor.* V.); and, therefore, its parts, ab and cd, will have the same ratio as their originals. (*Theor.* IV.) But, because of the vanishing point, O, the originals of Oa, Ob, Oc, and Od, are parallel (by *Cor.* 1, *Theor.* III.); wherefore, the original of CD is to the original of AB as cd to ab. Q. E. D.

PROBLEM 5.

Given the centre and distance of the picture, the intersection and angle of inclination of a plane, to find the vanishing line of that plane, with the centre and distance of the vanishing line.



Let C be the centre of the picture, and AB the intersecting line of the given plane.

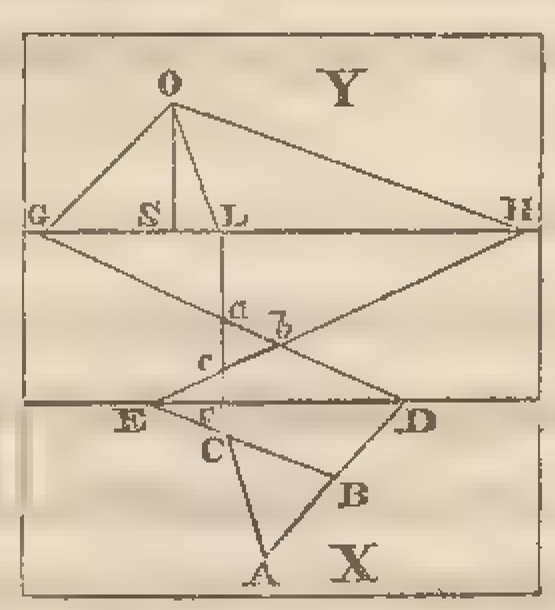
Draw CO parallel to AB, and equal to the picture's distance. Through C draw AS perpendicular to AB, and make the angle OSC equal to the inclination of the plane and picture. Draw SD parallel to AB, then will SD be the vanishing line required, S its centre, and OS its distance.

DEMONSTRATION.

Imagine the triangle OCS to be turned on CS as an axis, so that OS may be perpendicular to the picture, then O will be the point of sight; and SD being parallel to AB, a plane passing along SD and O will be parallel to the original plane, passing along the line AB, and inclined to the picture in the angle OSC: wherefore SD is the vanishing line required. OS, in that supposition, being perpendicular to SD, S is the centre, and SO the distance of the vanishing line. Q. E. D.

PROBLEM 6.

Given the intersecting and vanishing lines; the centre and distance of the vanishing line, with a figure in the original plane. To find the representation of that figure.



Method the first.—Let ED be the given intersecting line, GH the vanishing line, and S its centre. Draw SO perpendicular to GH, and make SO equal to the distance of the vanishing line GH.

Suppose the space, X, the original plane, to be turned on the line ED, as an axis behind the picture, and the plane Y to be turned on the line GH, as an axis before the picture, so as to be parallel to the plane X. Suppose, now, that AB is an original line in the plane X, of which the representation is required.

Produce AB to meet the intersecting line ED in D, and draw OG parallel to

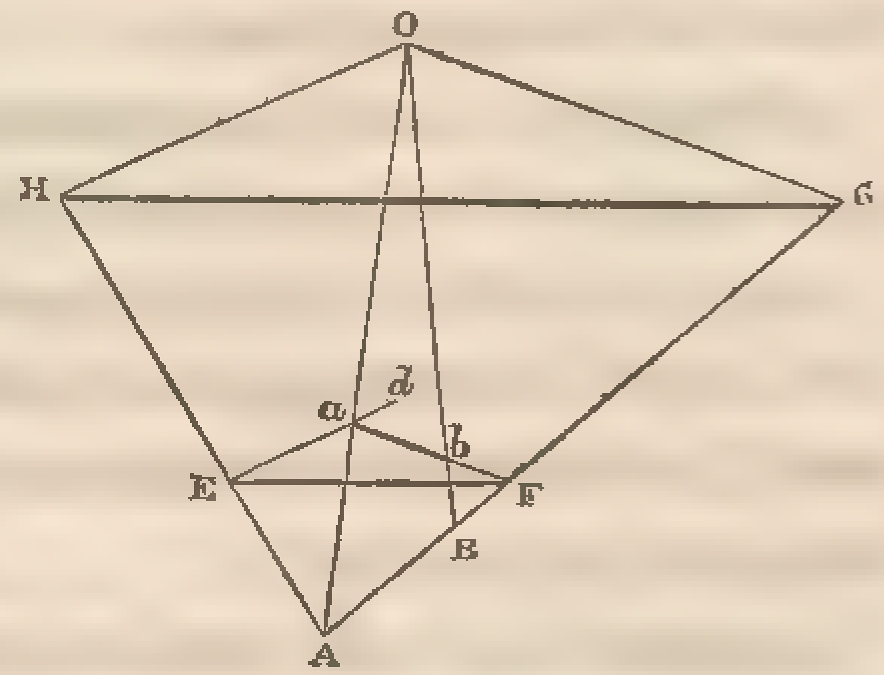
AB, meeting the vanishing line in G. Join DG, and DG will be the indefinite representation of AB. Through A and B draw, at pleasure, AC and BC, and, as before, find their indefinite projections, FL and EH intersecting DG in the points a and b; then will ab be the definite representation of AB.

DEMONSTRATION.

Imagine the planes X and Y to be turned round the lines ED and GH, as axes, till they become parallel to each other. Then, whatever may be the angle which the plane of the picture makes with the original plane, OG will always be parallel to AB; and, consequently, D will be the intersecting point of the line AB, G the vanishing point, and DG its indefinite representation. (*Theor.* III.) Also, the point a, found by the intersection of FL with DG, is the representation of the point A.

Method the second.—Suppose AB to be an original line given. Having found its indefinite representation, DG, as before, draw OA and OB, intersecting DG in a and b: then will a and b be the representations of A and B, the extremities of the original line AB, and the figure may be completed, as before.

Method the third, by Directors.—Let EF be the given intersecting line, HG the directing line, the distance between EF and HG being equal to the distance of the given vanishing line.



Let O be the point of sight in the directing plane, HOG, which, at present, for the operation, is supposed to be turned on HG, till it fall on the original plane. Again, let AB be a line in the original plane, which is also supposed to turn on the intersecting line, EF, till its plane fall on the original plane. Then, to find the representation of AB,

Produce AB, to meet the intersecting line, EF, in F, and the directing line, HG, in G. Join GO, and draw Fa parallel to GO; then Fa will be the indefinite representation of AB, as required.

If, from the point A, we draw any straight line, AE, and find the indefinite representation, Ea, in the same manner as Fa was found, then the intersection,

a, of these indefinite representations will be the representation of the original point A; and, in the same manner, the representation, *b,* of the original point, B, may be found, and the figure completed, as before.

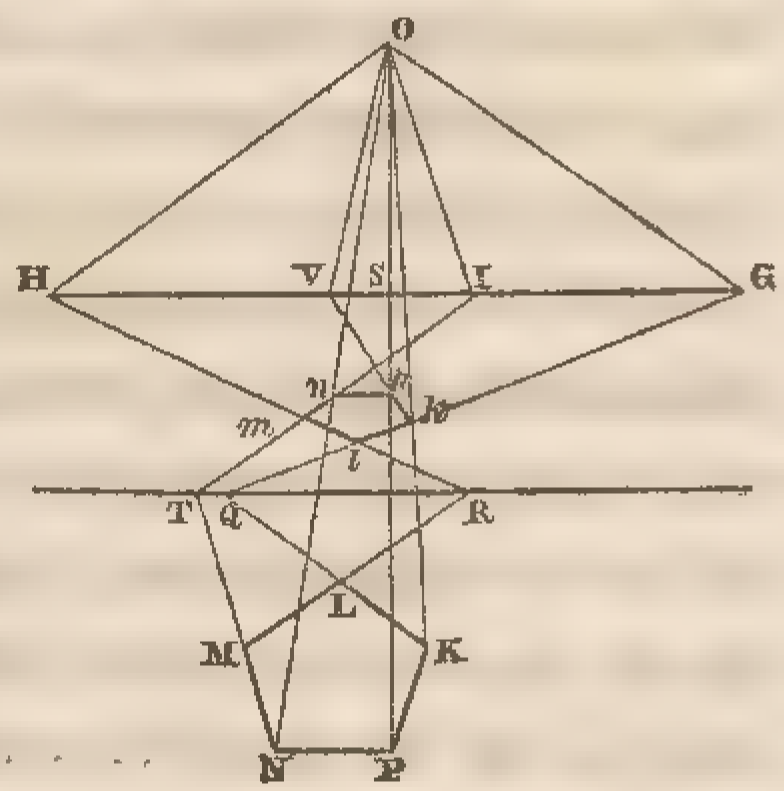
DEMONSTRATION.

Suppose the plane of the picture *a*EF to revolve on the line EF, and the plane HOG on the line HG, as axes, so as to be parallel to each other, and both elevated above the original plane, which is comprehended between the directing and intersecting lines HG and EF. Then O will be the point of sight, F the intersecting point of the original line AB, and G its directing point; but, whatever be the angles which the plane of the picture and the directing plane make with the original plane, they will always be parallel. Therefore, F*a* will be the indefinite representation of AB, (*Theor.* V,) and E*a* the indefinite representation EA; and, consequently, the point *a,* is the representation of the point A.

PROBLEM 7.

The same data being given, as in *Problem* 6, to find the representation of any figure in the original plane.

Example 1.—Let it be required to find the representation of the pentagon KLMNP.

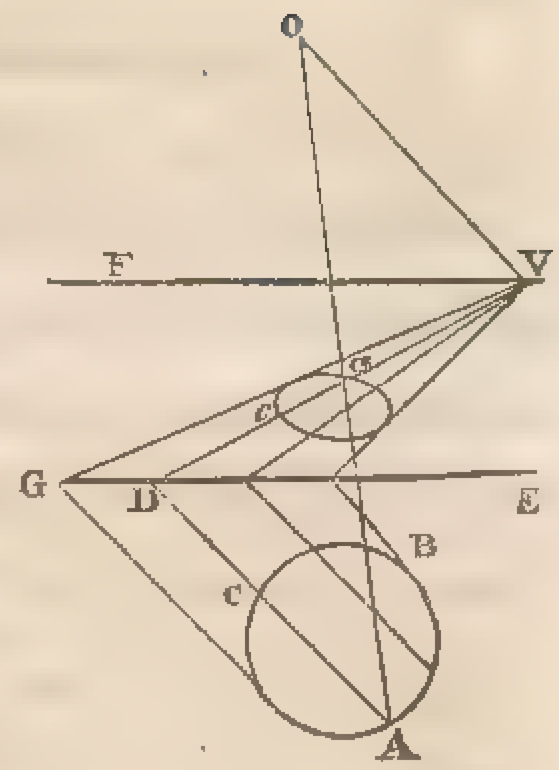


Draw OG, OH, OI, and OV parallel to KL, LM, MN, and KP, meeting HG in the points G, H, I, and V, which are the vanishing points of the lines KL, LM, MN, and KP.

Produce KL, LM, MN, to their intersecting points, Q, R, and T. Draw QG, RH, and TI, intersecting each other in the points *l, m,* which are the representations of the points LM. Join OK, ON, intersecting the indefinite representations QG, TI, in the points *k* and *n.* Draw *k*V, which is the indefinite representation of KP. Lastly, draw OP, intersecting *k*V in *p*; and *p* is the representation of P.

The representations of curve-lined figures, are obtained by finding the representations of a sufficient number of points, and joining them neatly by the hand.

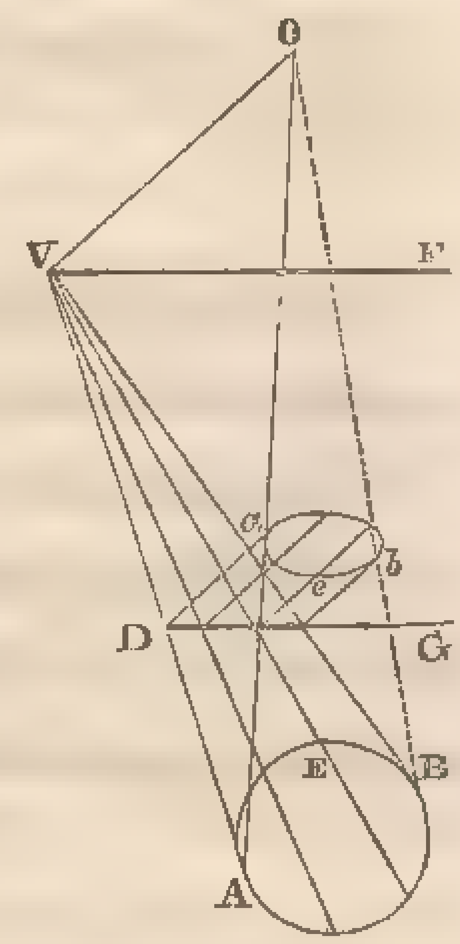
Example 2, *by a Vanishing Point.*—Let FV be the vanishing line, GE the intersecting line, O the point of sight, and the original figure, ABC, a circle. Then the representation *a* of any point, A, may be found thus.



Through A draw AD, at pleasure, meeting GE in D; and draw OV parallel to AD, meeting FV in V. Join DV and AO, intersecting each other in *a*; then *a* is the representation of the point A.

In finding the representations of the other points in the circle, much labour may be saved by drawing lines through all the points parallel to AD, for then one vanishing point will serve for ascertaining the representations of as many points in the original figure as are necessary.

Or, by a Directing Point, thus:—Let VF be the directing line, O the point of sight, and DG the intersecting line, AEB the original plane.



Draw AV, at pleasure, meeting DG in D, and VF in V. Join OV, and draw D*a* parallel to VO, and let OA intersect D*a* in *a*. Then *a* is the representation of A.

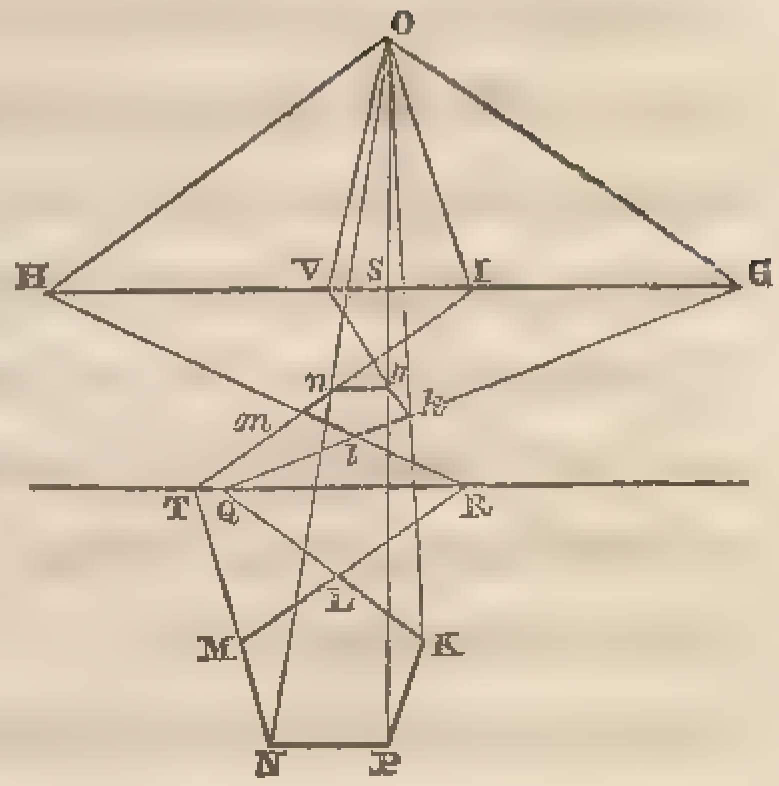
And as many points as may be thought necessary may be found in the same manner; but much labour will be saved by employing the same vanishing point for all the points in the circumference. In this case, the indefinite representations will be parallel to D*a*.

PROBLEM 8.

To find the representation of any figure in a plane parallel to the picture. The representation being similar to its original (by *Cor.* 2, *Theor.* IV,) we have only to find the representation of one line of the original figure, and on that line, as a side, construct a figure whose homologous sides shall have the same ratio as those of the original figure.

PROBLEM 9.

Given the intersecting and vanishing lines, the centre and distance of the vanishing line, with the representation of a figure. To find the original of that figure, whose representation is given:

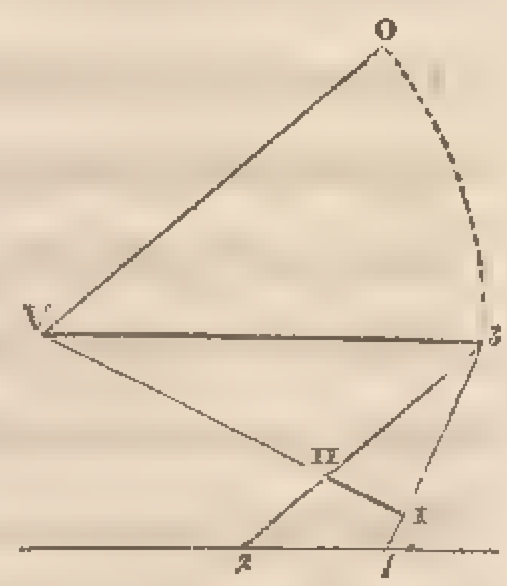


Let it be proposed to find the original of the pentagon *klmnp*. Produce the sides till they meet the intersecting line, in the points Q, R, T, and the vanishing line in the points G, H, I; and produce *kp* to its vanishing point, V. Draw OG, OH, OI, OV, and QK, RM, IN, parallel to the first three respectively, meeting in L and M, which will be the originals of *l* and *m*. Draw O*k* and O*n*, which will meet QL and TM in the original points, K and N. Then draw KP parallel to OV; and let O*p* be also drawn, meeting KP in P, which is the original of *p*.

Lastly, draw NP, and we shall have KLMNP the original of *klmnp*.

This problem being the reverse of Problem 7, the truth of the construction is manifest.

PROBLEM 10.

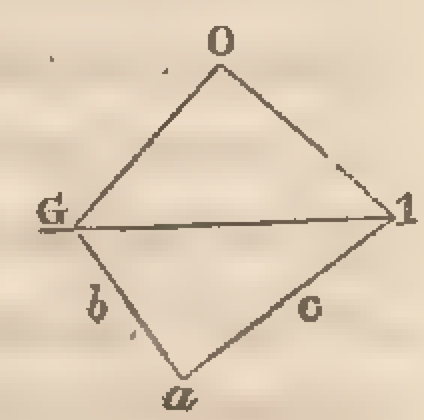


The same data being given, to find the original of one representation only.

Produce I, II, to its vanishing point V; and draw VO. In the vanishing line take V3 equal to VO. Join 3I, 3II, which produce to the intersecting points, 1, 2. Then will 1, 2 be the length required of the original I, II.

PROBLEM 11.

Given the vanishing line, its centre, and distance, with the representation of a line. To find the representation of another line, so that the originals of the two lines shall contain a given angle.



Let G1 be the vanishing line, O the point of sight, and *ab* the representation given.

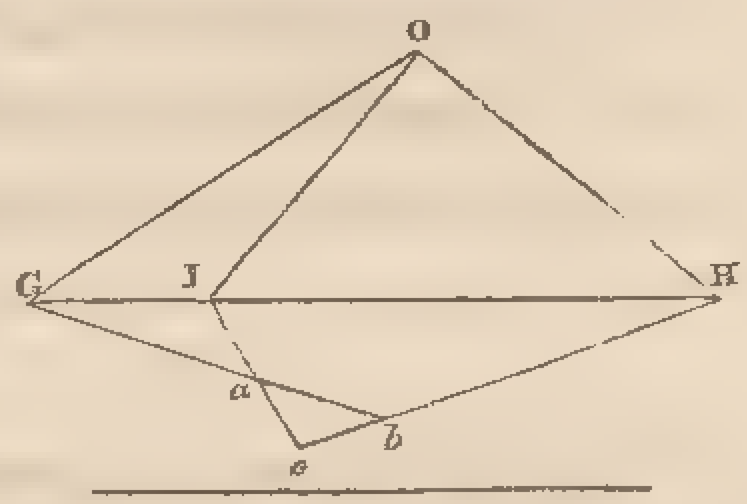
Produce *ab* to its vanishing point, G. Join GO, and make the angle GO1 equal to the given angle, and draw 1*ca*, which will be the line required.

DEMONSTRATION.

This is evident from *Def.* 14, and from *Theor.* III; for the radials of two original lines which form an angle, make an angle equal to that of the originals. Then *bac* is the representation of that angle.

PROBLEM 12.

Given the vanishing line, its centre, and distance, with the representation of one side of a triangle, whose species is given. To find the representation of the whole triangle.



Let ab be the given representation, which produce to its vanishing point, at G. Join GO, and make the angle GOI equal to the angle, which the side of the original triangle, whose representation is given, makes with the other side, terminating in the same point. Draw OH to make an angle equal to the obtuse angle of the triangle. Join Hb, which produce to c; then will abc be the representation required.

PROBLEM 13.

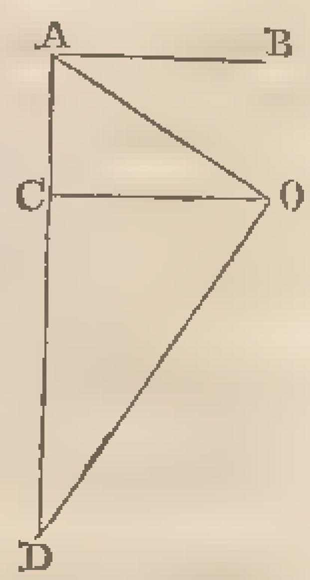
Given the vanishing line, its centre, and distance, with the representation of one side of any figure. To find the representation of the whole figure.

Resolve the figure into as many triangles as it has sides, by diagonals drawn from the nearest angle to all the other angles; then find the representations of these triangles one after another.

This may be done otherwise, by the application of the preceding problems.

PROBLEM 14.

Given the centre and distance of the picture, with the vanishing line of a plane, to find the vanishing point of lines perpendicular to that plane.



Let AB be the given vanishing line, and C the centre of the picture. Through C draw AD, perpendicular, and CO parallel, to AB. Make CO equal to the distance of the picture. Join AO; and draw OD perpendicular to AO. Then D is the vanishing point of the lines required.

DEMONSTRATION.

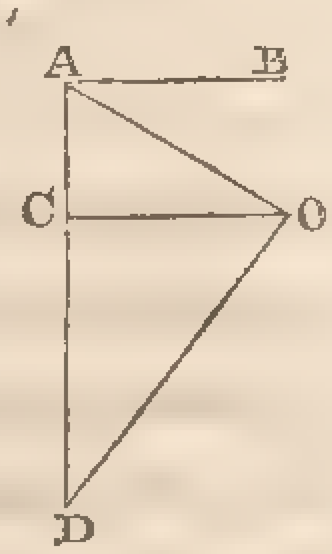
Suppose the triangle AOD to be turned round AD, as an axis, until its plane becomes perpendicular to the plane of the picture. This done, the plane, passing

through the point of sight O, and the vanishing line AB, will be parallel to the original plane; and the line OD will be perpendicular to this plane, passing through the point of sight, and, consequently, will be parallel to lines which are perpendicular to the original plane. Therefore D is the vanishing point of these lines.

Cor.—The original plane is perpendicular to the picture, when the vanishing line AB passes through its centre. In this case, the vanishing point D will be infinitely distant, and the representations sought, perpendicular to AB.

PROBLEM 15.

Given the centre and distance of the picture, with the vanishing point of parallel lines. To find the vanishing line of a plane, whose original is perpendicular to the original parallel lines.



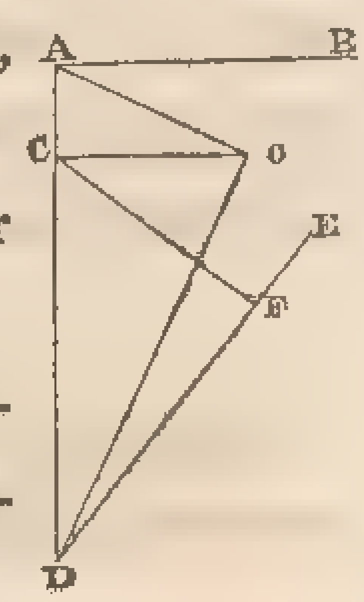
Let C be the centre of the picture, and D the vanishing point of parallel lines.

Through C draw DA, and let CO be perpendicular to DA. Make CO equal to the distance of the picture. Join DO; draw OA perpendicular to DO; and, through A, draw AB parallel to CO. Then AB will be the vanishing line required, A its centre, and OA its distance.

This construction necessarily follows from the preceding problem.

PROBLEM 16.

Given the centre and distance of the picture, with the vanishing line of parallel planes. To draw through a given point another vanishing line of a plane which is perpendicular to that plane, whose vanishing line is given; and to find the centre and distance of the vanishing line thus drawn.



Let AB be the given vanishing line, C the centre of the picture, and E the given point.

Find (by *Prob.* 14.) the vanishing point D, of lines perpendicular to the original plane, whose vanishing line is AB.

Join DE, which is the vanishing line required. Draw CF perpendicular to DE, meeting it in F, and F is the centre of the vanishing line DE (by *Theor.* I).

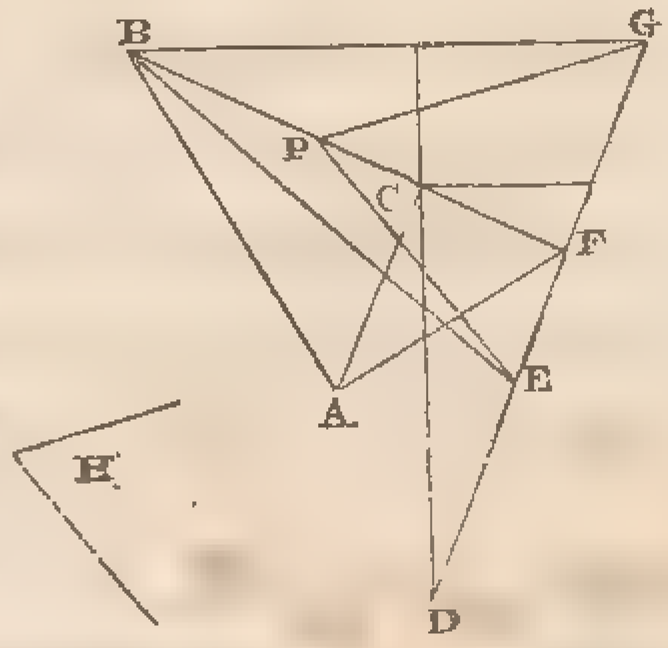
With CF, as a base, and the distance of the picture as a perpendicular, draw a right-angled triangle; then the hypothenuse is the distance of the vanishing line required.

DEMONSTRATION.

Because the plane, whose vanishing line is required, is perpendicular to the other, whose vanishing line is given, its vanishing line must pass through the point D. Q.E.D.

PROBLEM 17.

Given the centre and distance of the picture, the vanishing line of the common intersection of two planes, inclined at a given angle, and the vanishing line of one of them, to find the vanishing line of the other.



Let C be the centre of the picture, BG the given vanishing line of one of the planes, B the vanishing point of their common intersection, and H the angle of their inclination.

Find the vanishing line, GD, of planes perpendicular to the lines whose vanishing point is B, (by *Prob.* 15,) and let that vanishing line cut the vanishing line given in G. In GD find the point E of lines, making a given angle, H, with the lines whose vanishing point is G, (by *Prob.* 11,) that is, in BCF, which is perpendicular to GFD; make FP equal to the distance of the vanishing line, GD; and draw PG and PE, making the angle EPG equal to H; and draw BE, which is the vanishing line required.

DEMONSTRATION.

Draw CA perpendicular to BF, and equal to the distance of the picture, and join AF and AB; then will AF be equal to FP. Imagine the triangle, BAF, to be turned on BF, until its plane be perpendicular to the picture. Imagine, also, the triangle, GPE, to be turned round GE, until FP coincide with FA; and the planes BPG, DPB, will be parallel planes of the originals, whose vanishing lines are BG, GD, DB. Q. E. D.

EXAMPLES.

In the application of Perspective to figures in the original plane, to save repetition in describing the diagrams, VL is the vanishing line, IN the intersecting line, C the centre of the picture, in the vanishing line VL. CP is drawn perpendicular to VL, and equal to the distance of the picture.

The space below the intersecting line, IN, is supposed to be the original plane. The space above the vanishing line, VL, may either be considered as a continuation of the picture upwards, or the plane which passes through the eye parallel to the original plane.

Ex. 1.—To find the representation of a point A. (*Fig.* 2, *Plate* V.*)

In CP make PD equal to the height of the eye. Draw A*f* towards D, meeting IN in *f*. Through A draw any line, AI; and draw Pa parallel thereto, meeting the vanishing line in a; and join Ia. Draw a perpendicular to IN, from *f*, to meet Ia; and the point of intersection will be the representation of the original point A.

Here the point D is used as a directing point; and where it appears in the subsequent diagrams, it is used for the same purpose.

Ex. 2.—To find the vanishing point of an original line, AB. (*Fig.* 2.)

Draw Pa parallel to AB, meeting the vanishing line in a; then a is the vanishing point required.

Ex. 3.—To find the intersecting point of a given line, AB. (*Fig.* 2.) Produce BA to meet the intersecting line in I; then I is the point required.

Ex. 4.—To find the indefinite representation of the line AB. (*Fig.* 2.) Find the vanishing point a, (as in *Example* 2,) and the intersecting point *d*, (as in *Example* 3.) Join a*d*, and a*d* will be the representation required.

Ex. 5.—An original line, AB, (*Fig.* 2,) a point in that line, and the indefinite representation, a*d*, being given; to find the representation of the point.

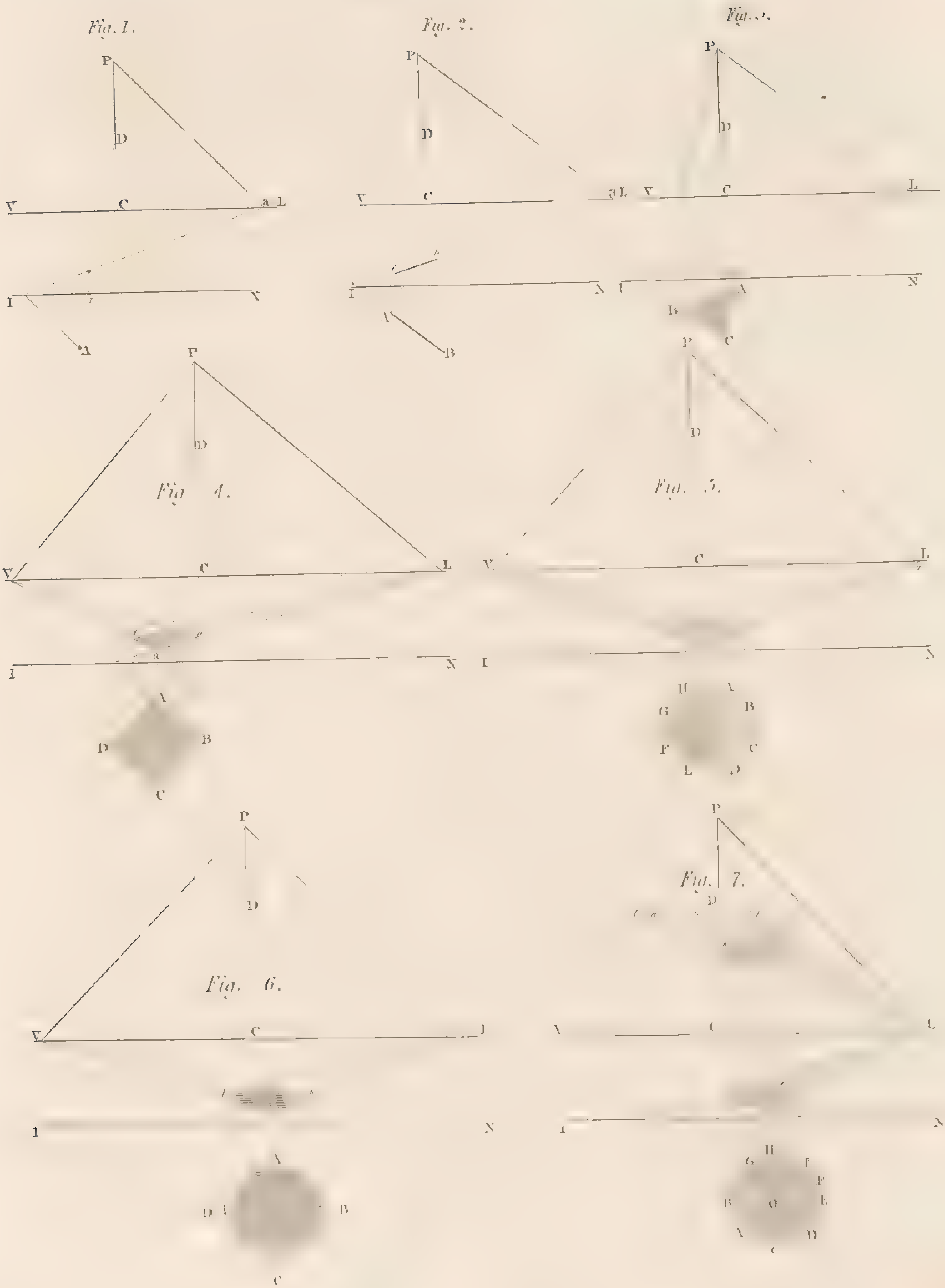
Draw A*f* towards D, meeting the intersecting line in *f*, and draw *fa* perpendicular to IN, meeting the indefinite representation a*d* in *a*; then *a* is the representation of the point A, as required.

Hence we may find the representation of a line, AB, limited at both ends.

Ex. 6.—To find the representation of any plane figure.

* This plate has been numbered V. by *mistake*. It is, properly, *Perspective, Plate* I. Hence, VI. should be II., &c.

PERSPECTIVE.



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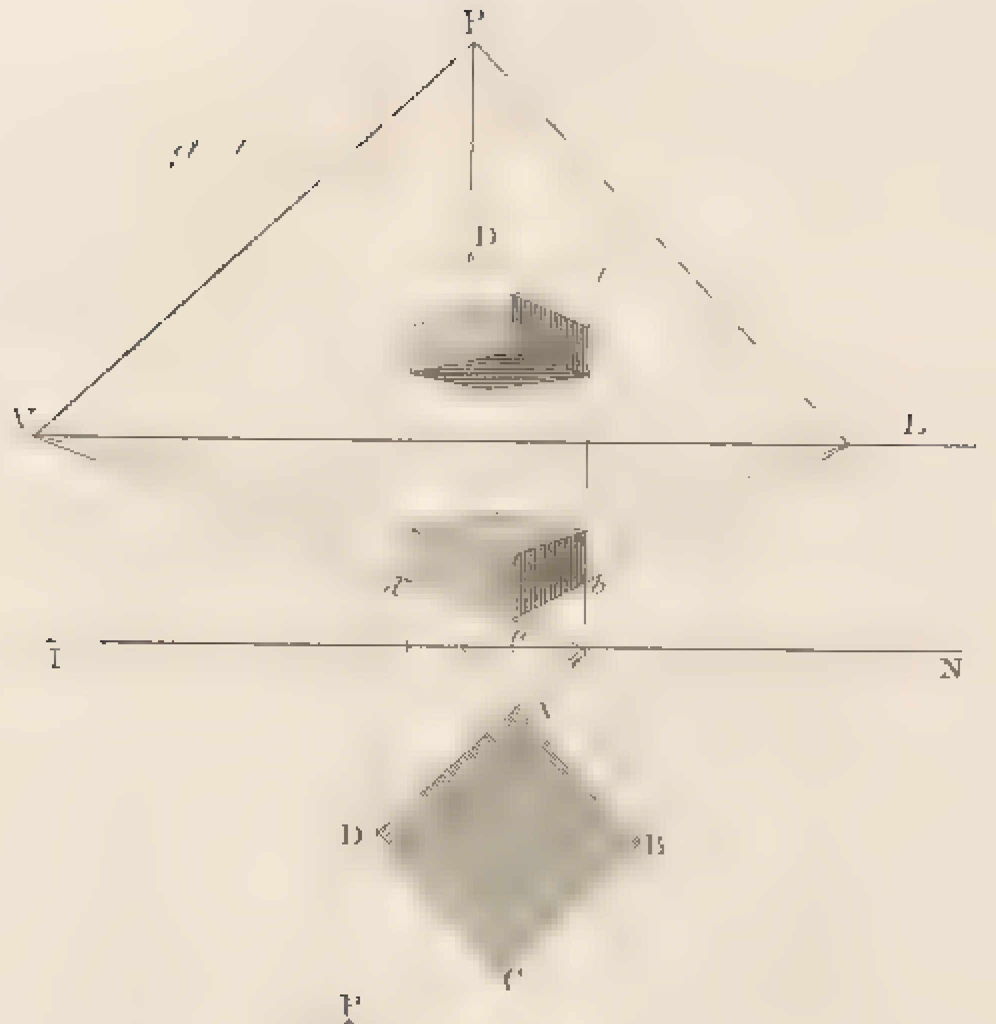

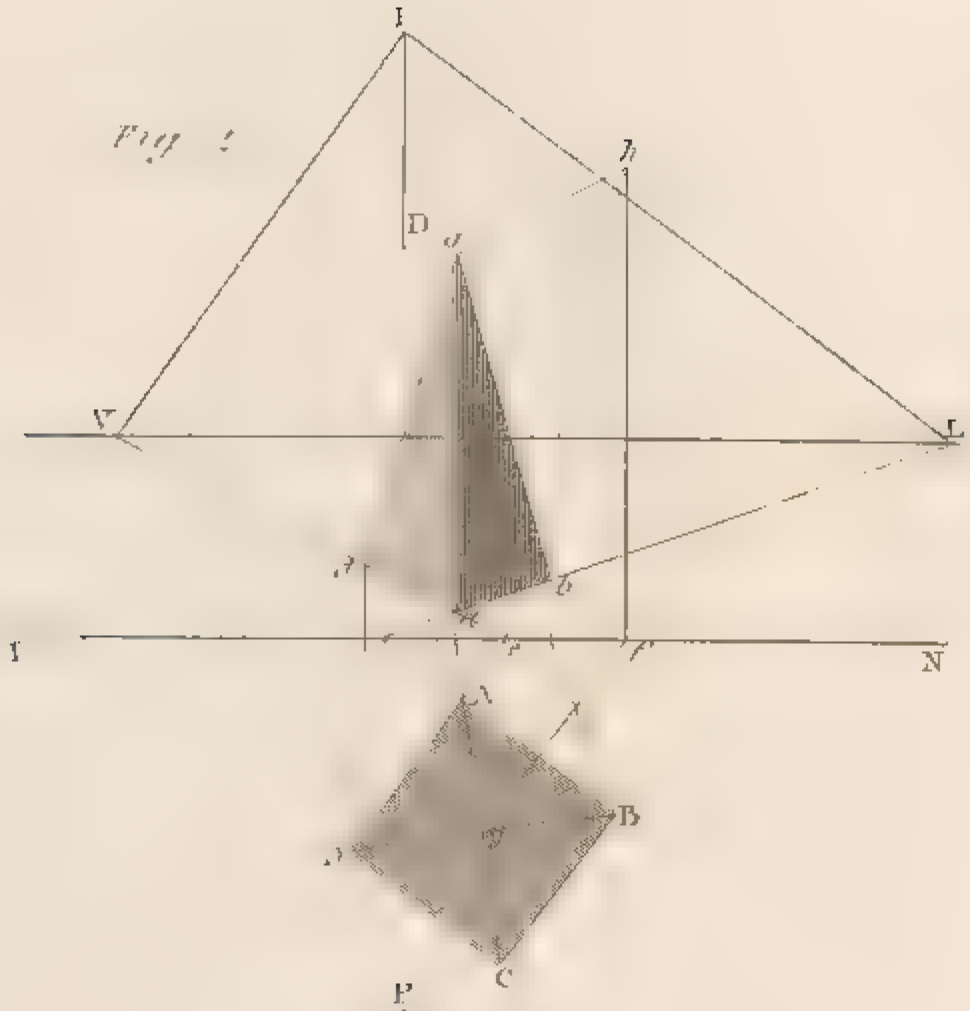

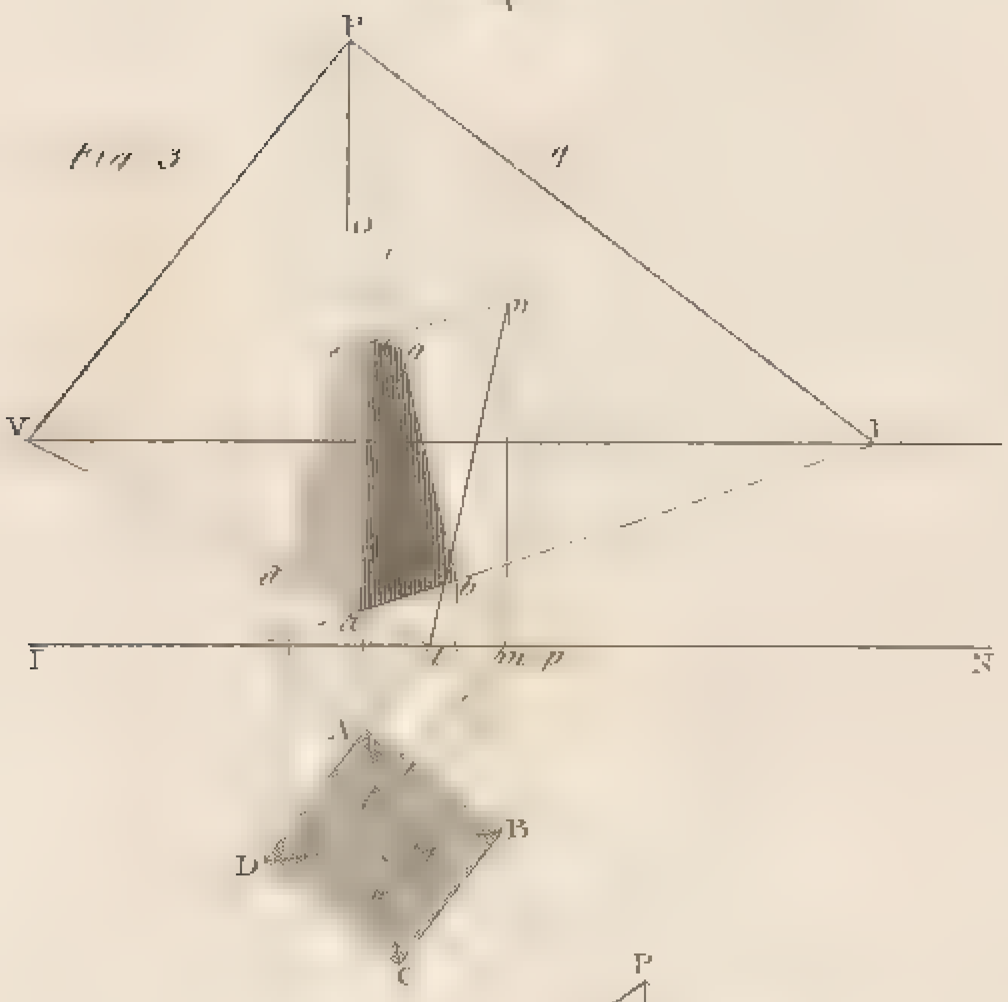

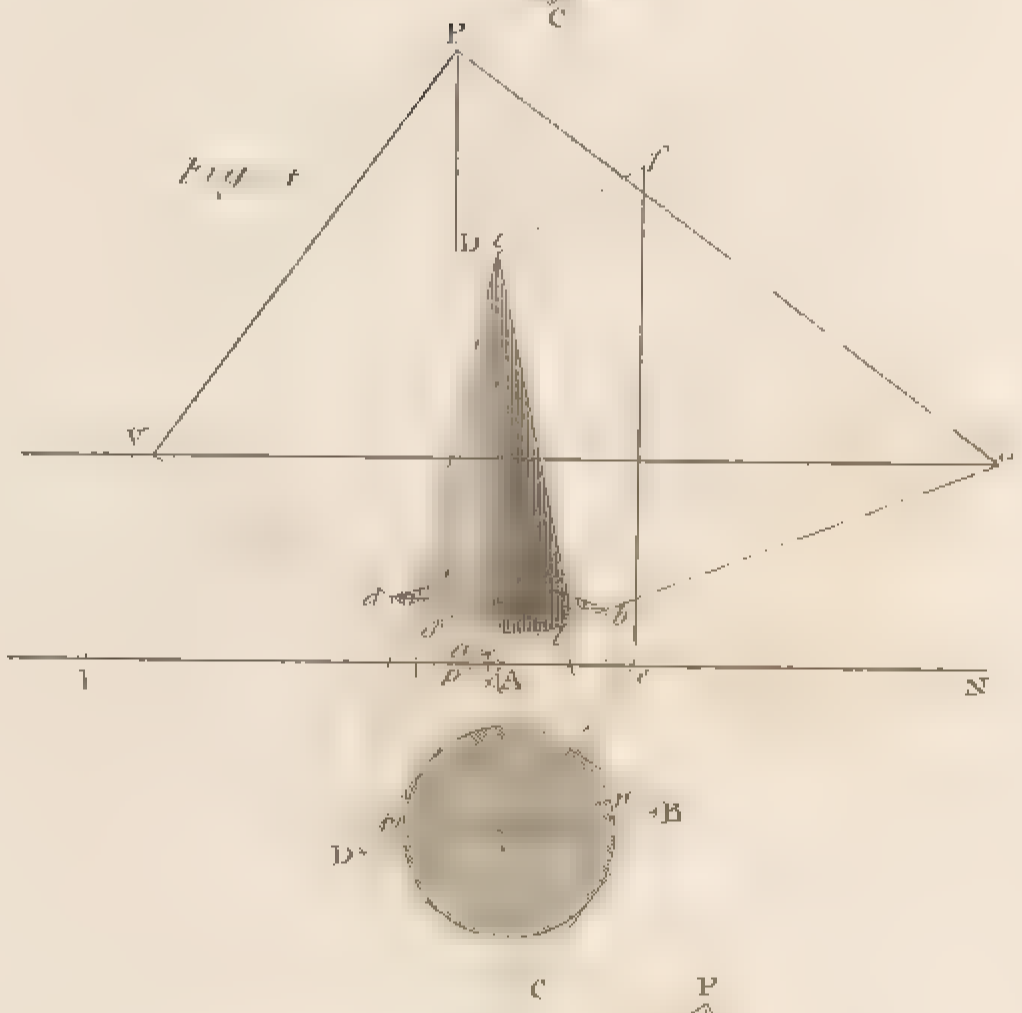

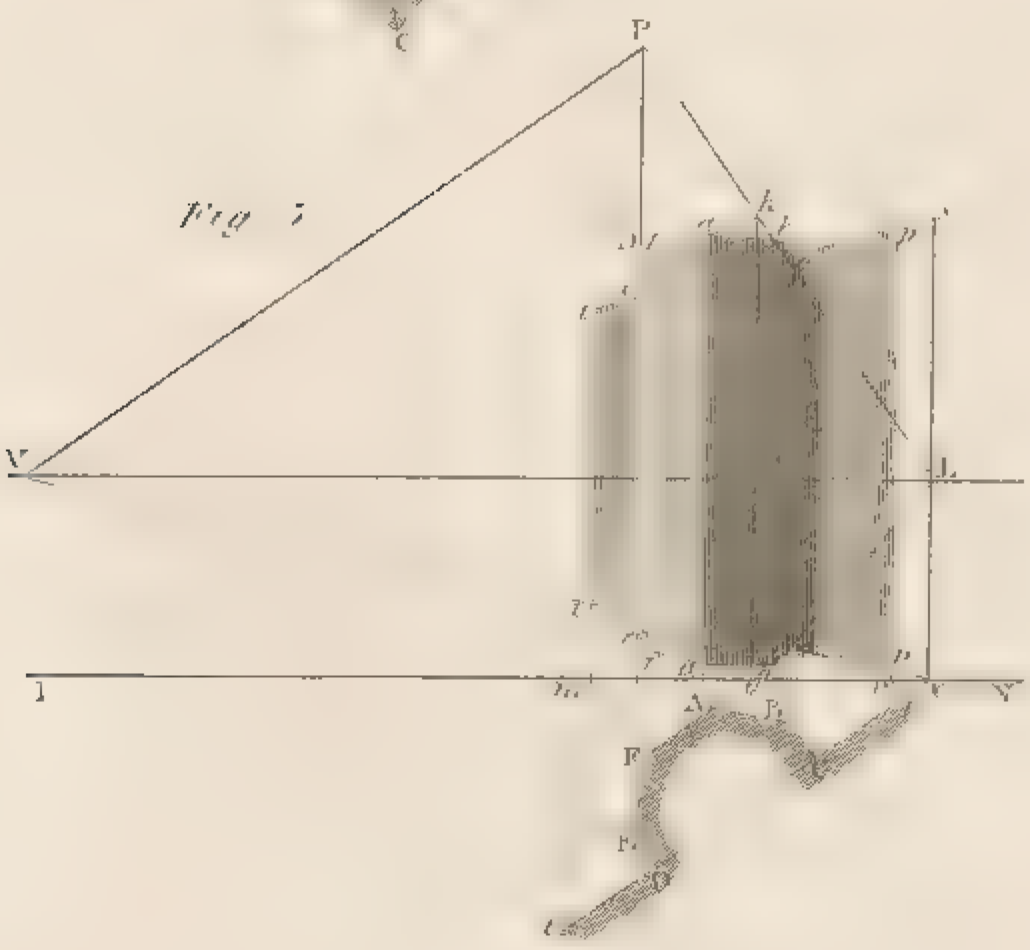

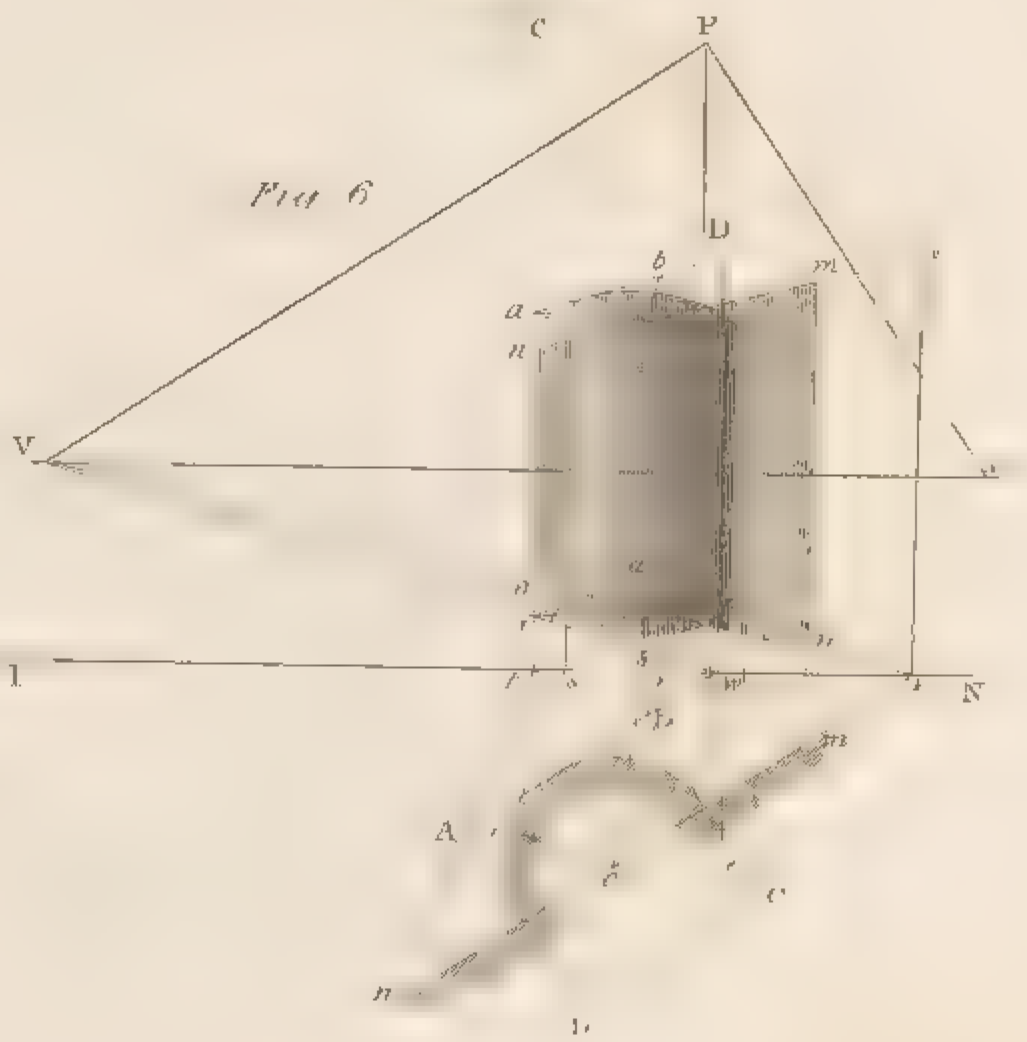

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Find the indefinite representation of all the sides, and the space enclosed by these representations will be the representation of the figure.

Figure 3 shows the representation of a triangle: *fig.* 4 the representation of a square; and *fig.* 5 the representation of a hexagon.

Ex. 7.—To find the representation of a circle. (*Fig.* 6.)

Find the representation, *abcd,* of a square, circumscribing the circle; draw the diagonal of the trapezium, which represents the square; find the representation of two lines, touching the circle in E and F: and the representations, *e* and *f,* of these points, with the intersection of the two diagonals of the trapezium, is in the representation of the circle. Draw a line to each vanishing point of the square, through the representation of the centre, to cut or meet each line of the representation of the sides.

Through the four points of the trapezium, and the two points *e* and *f,* describe an ellipse, which will be the representation required.

Ex. 8, *fig.* 7, shows the representation of a circle, by drawing parallel lines through the figure, and finding the indefinite representation of these lines, with the representations of the points where the parallels cut the original circle. An ellipse being described through the points thus found, will be the representation of the circle.

Ex. 9.—*Fig.* 1, *pl.* VI, exhibits the representation of a rectangular block, as it would appear if placed on the ground, and also as it would appear if placed above the level of the eye. The heights are set off on the perpendicular, *fe,* from the intersecting point, *e.*

Ex. 10.—To find the representation of a square pyramid.

Let ABCD, (*fig.* 2,) be the plan. Produce DA to its intersecting point *e,* and draw *gf* parallel to DA. Find the representations of the sides AD and AB by the preceding examples. From the centre of the plan, *g,* draw a line to the directing point D; and from the point where this line cuts the intersecting line, IN, raise an indefinite perpendicular; also, draw *hf* perpendicular to IN, and equal to the height of the pyramid. From *h,* draw a line to the vanishing point V, cutting the indefinite perpendicular in *g*; then *g* is the vertex of the pyramid; and join *gd,* *ga,* and *gb,* which will complete the representation.

Ex. 11.—To find the representation of a frustum of a square pyramid, *fig.* 3.

Find the representation of the entire pyramid, as in the last example; and let

efgh be a plan of the top of the frustum. Draw *ef* to its intersecting point *m*, and make *mn* perpendicular to IN, and equal to the height of the frustum. From *n*, draw a line to the vanishing point V, which will give *ef*, the edge of the frustum; and from *f* draw, to the other vanishing point, L, the line *fg*, which completes the frustum.

Ex. 12.—To find the representation of a cone, *fig.* 4.

Find the representation of the base, as in the example (*fig.* 6, *pl.* V.); and the representation of the vertex, as (in *Example* 10.) Then join *om* and *on*, which complete the picture of the cone.

Ex. 13.—*Fig.* 5, *plate* VI, is a representation of a wall, with a semi-octagon tower projecting from it. Towers of this kind are very common in Gothic buildings.

Ex. 14.—*Fig.* 6 shows an example of a round tower joining a straight wall.

These two examples may be considered as exercises of the application of the rules already given.

Ex. 15.—To find the representation of a flight of returning steps. (*Fig.* 1, *plate* VII.)

Produce the lines that form the boundary, and the lines that divide the steps on the plan to their intersecting points, *e*, *f*, *g*, and find the vanishing points of these lines. From the points *e*, *f*, *g*, draw perpendiculars to the intersecting lines. On each of these perpendiculars set the respective heights of the steps, and draw lines from the extremities of each to the vanishing point.

Find the termination of each face by the perpendicular lines, as seen in the figure, and also the vanishing point of the other side. Draw lines to this point from the corners of the faces, which lines will represent the heights. Find the terminations of these faces; then the returning lines being drawn to each vanishing point, will complete the representation of the steps as required.

Ex. 16.—*Fig.* 2 is the representation of a flight of steps, with kirbs at the ends. The perspective heights are found, by finding a section of the steps on the plane of the picture, and the lengths are found by the directing point D.

Ex. 17.—*Fig.* 3 is the representation of a square tower. The first thing to be done is to find a section of the face, as shown by a dark line. Set the heights of the door and windows upon this line, and draw lines from all the points of the section to the vanishing points of that side of the plan. By this mean, all the projecting

PERSPECTIVE.

Fig. 1

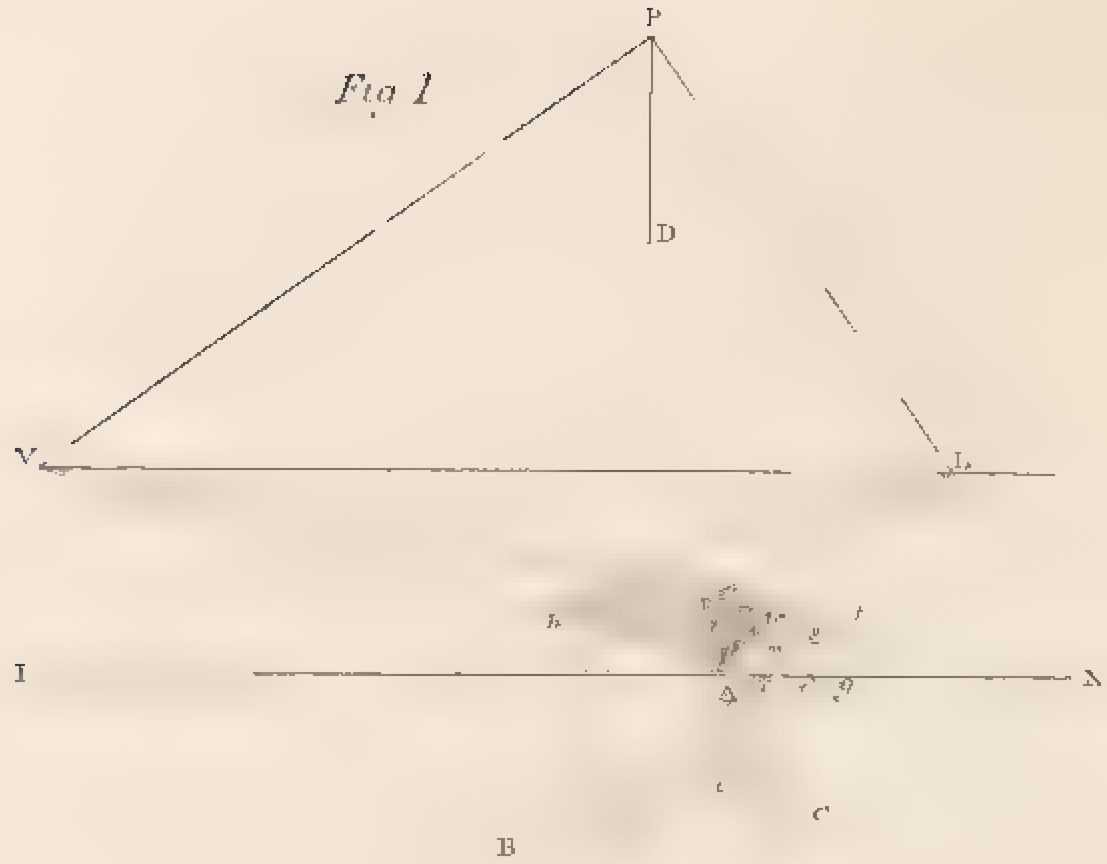


Fig. 2

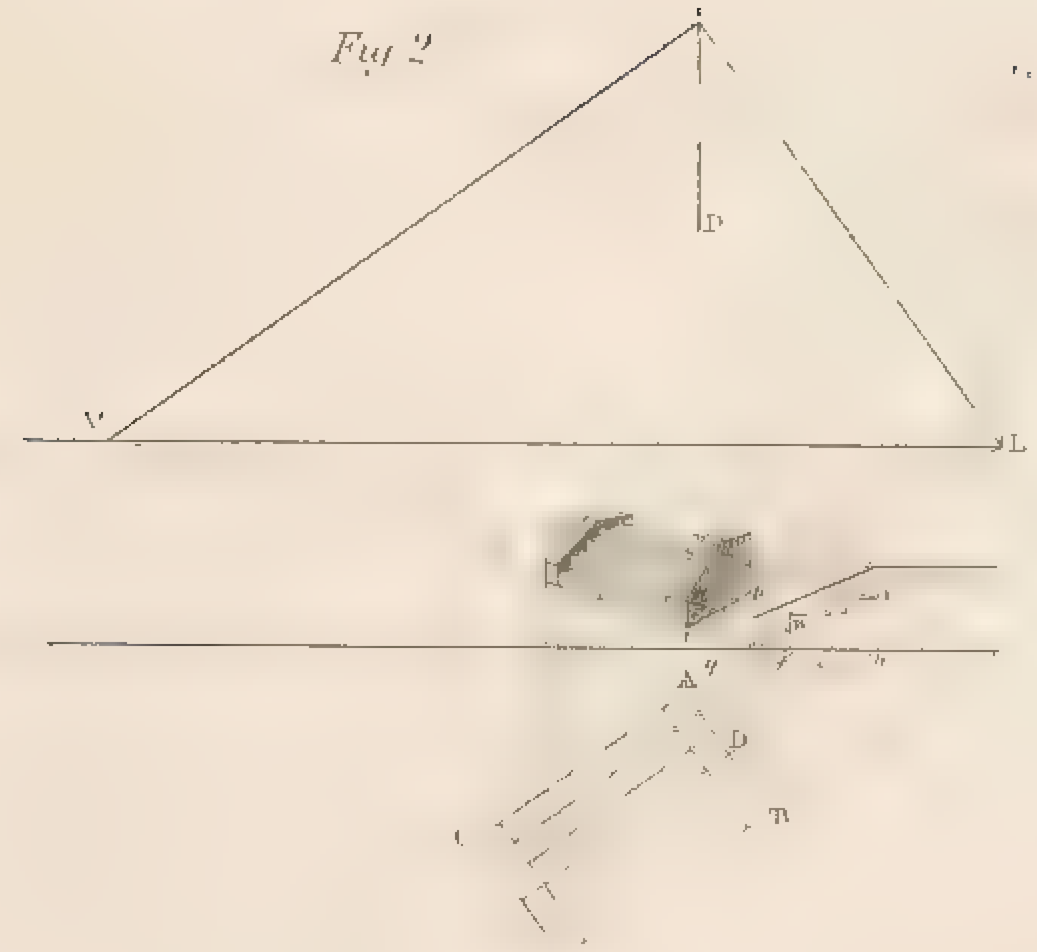


Fig. 3

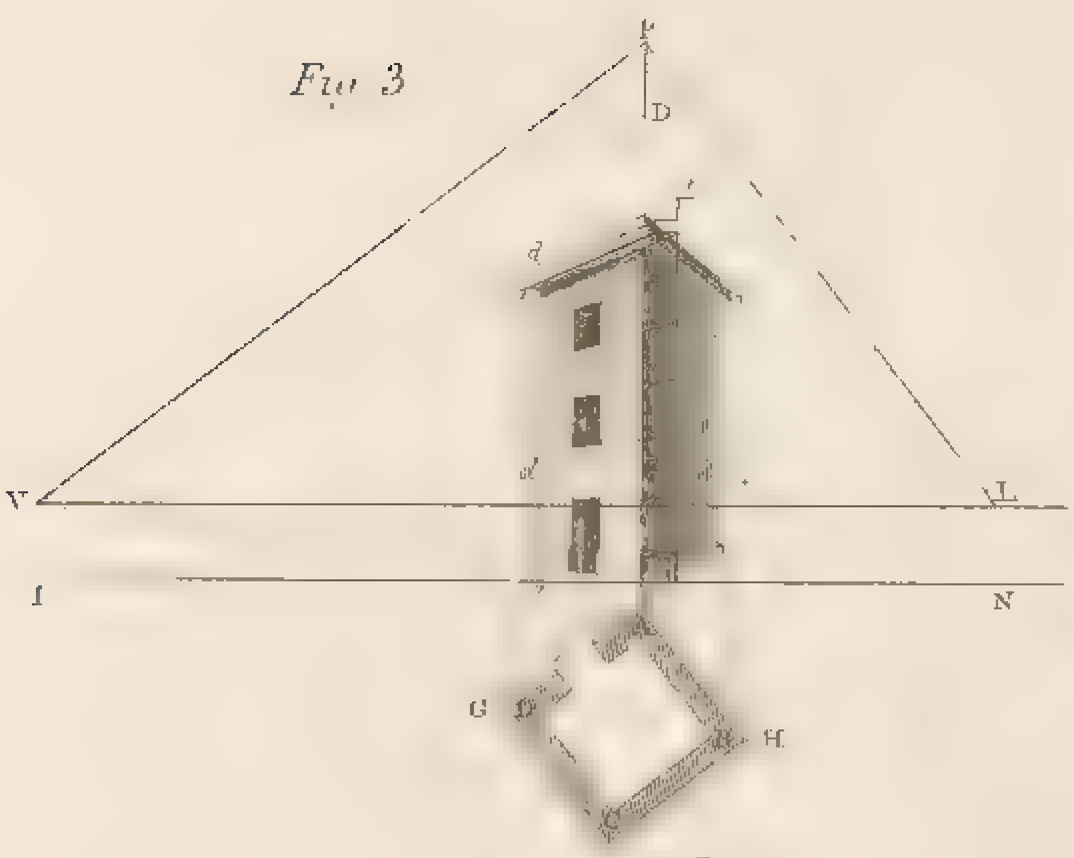


Fig. 4

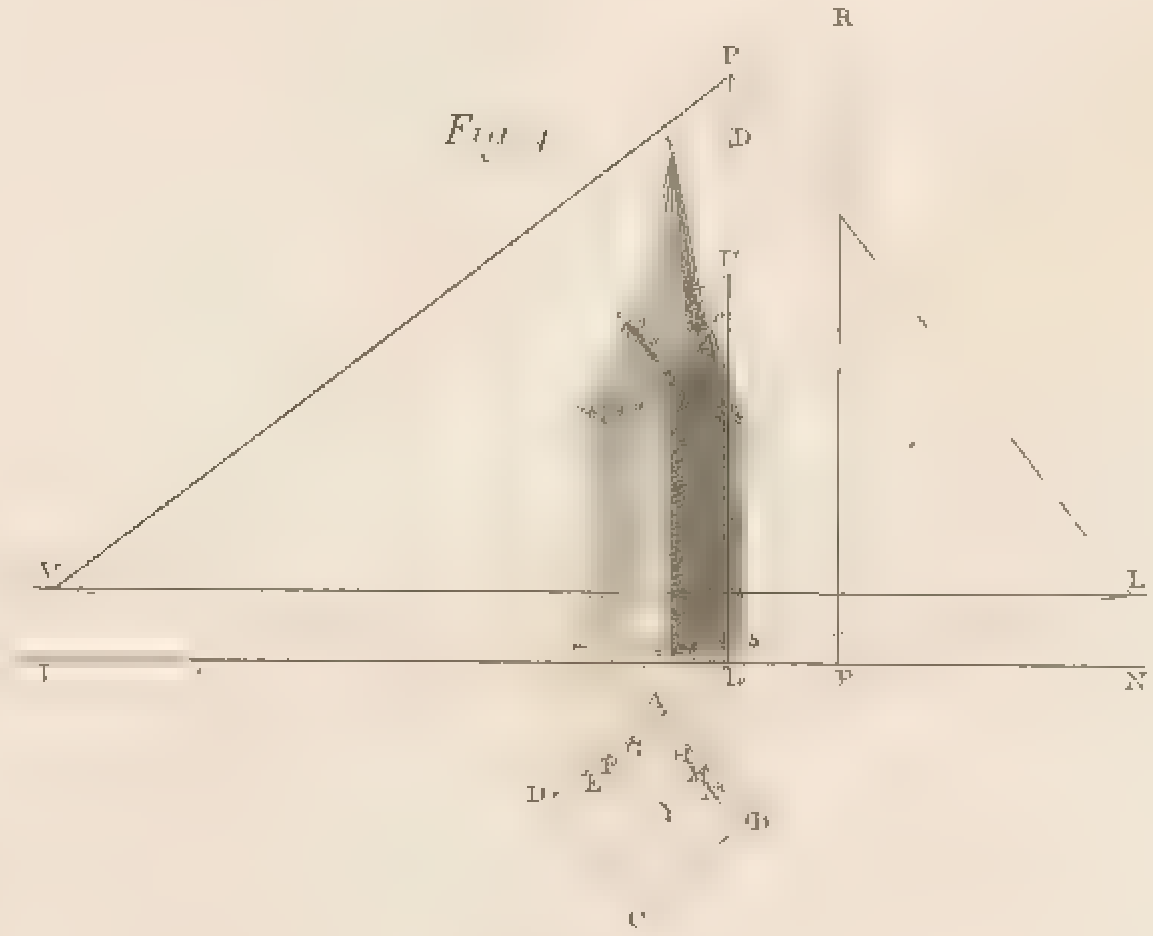


Fig. 5.

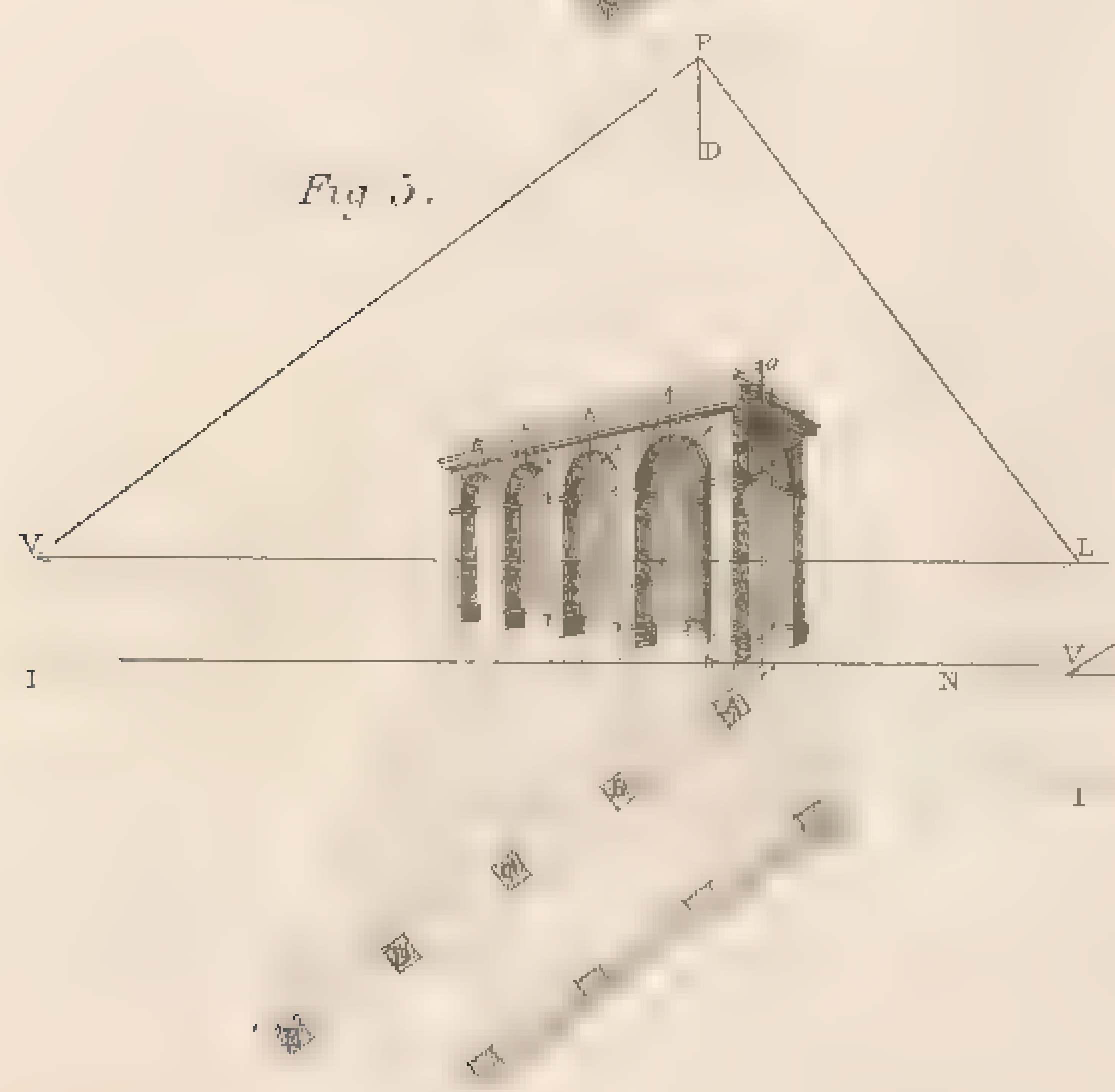
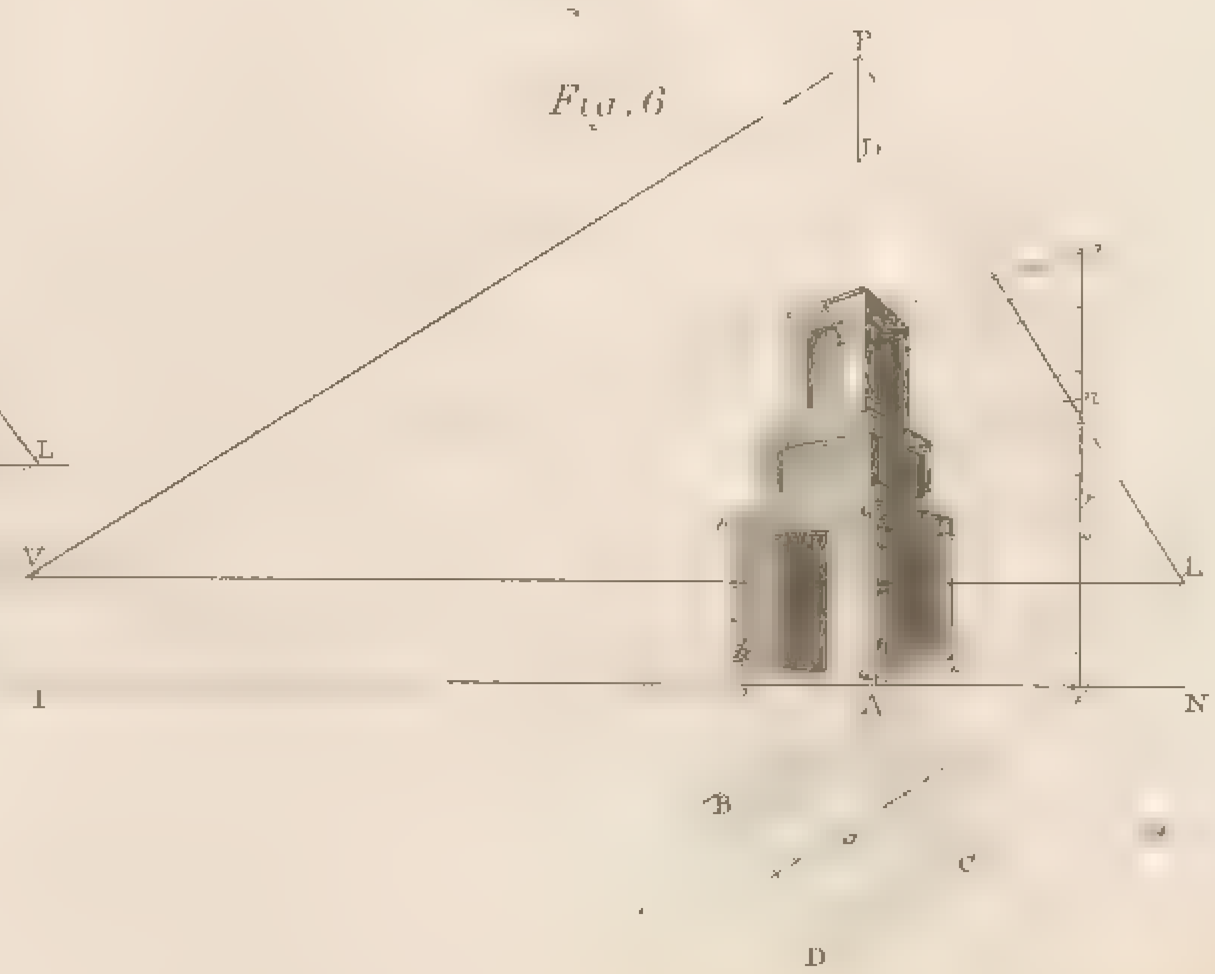


Fig. 6



Drawn by M. A. Nicholson.

Engraved by W. Symns.

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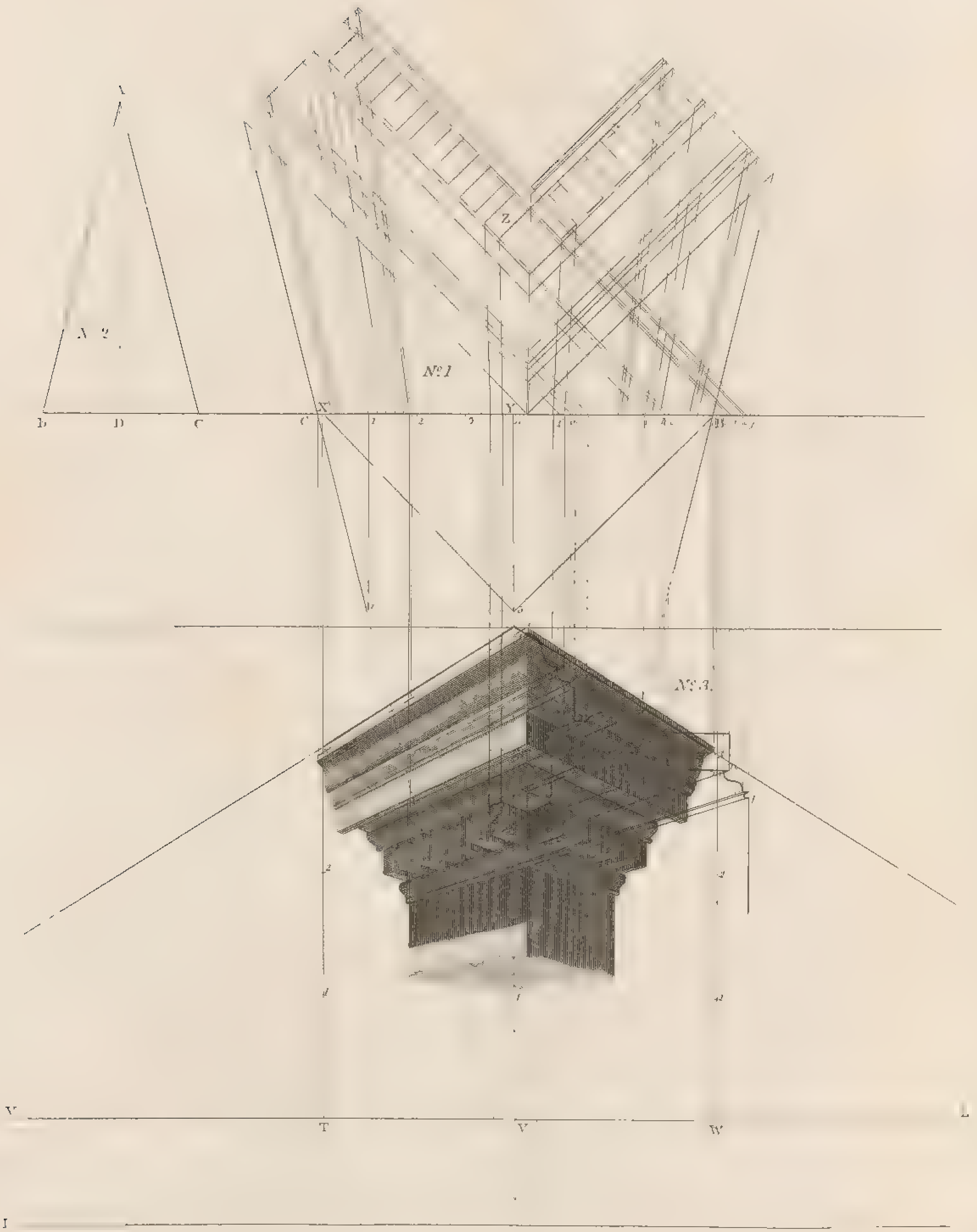
PERSPECTIVE.



Drawn by M.A. Nicholson.

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parts, as cornice and plinth, will be found. Then, having found the perspective breadth of the front, the terminations of the cornice, and breadth of the windows, the front will be finished.

The return end will be found in a similar manner to the last two examples.

Ex. 18.—To find the representation of a tower and spire.

Our first object is to find the representation of the rectangular part, and on this draw the perpendicular lines that represent the angles of the octagon. Produce DA, (*fig.* 4,) on the plan, to L, its intersecting point. Draw LU perpendicular to IN. Set off the height of the tower and pediment on LU. Draw lines from these heights to the vanishing point V. As the vertex of the pyramid is not in the same plane with the front, draw YP through the centre of the plan, parallel to the front line AD, meeting IN in P. Draw PR perpendicular to IN. Set the height of the spire from the ground on PR, and draw RV. Draw a line from Y to D, meeting IN; and, from the point of meeting, draw a perpendicular to the intersecting line, and the point where it meets RV is the vertex of the pyramid.

The sides of the spire are found by drawing lines from points in the lines, *ad, ad,* which represent the angles on the plan.

Ex. 19.—*Fig.* 5 represents an arcade, or range of arches. The pillars are drawn, like as many square towers, of a certain height. The arches are found by circumscribing a rectangle on each, drawing the diagonals, and making the heights of the points, *r, q, m, l,* double the heights of the arches; then drawing lines to each of these points, from the chord line of each arch, to cut the diagonals. The elliptic heads will pass through these points, and through the points where the perpendiculars meet the top side of the representation of the rectangle.

The circular heads of the inner face are drawn in the same way. The cornice and plinth are drawn as in the square tower, *figure* 3.

Ex. 20.—*Fig.* 6 exhibits the representation of a square tower, consisting of different stages. Of this nothing can be said more than what has already been explained, and what will be understood by the lines in the drawing.

Ex. 21.—*Plate* VIII shows the representation of a denticulated cornice. The profiles of the mouldings, in the representation, are found by means of the section, in dark lines, and the terminations, or lengths, are found as in the preceding examples. In this example the plan is above the representation; an arrangement

which shows the relations of the lines in a more evident manner, and which, in some cases, is more convenient than placing it below.

Ex. 22.—*Plate* IX exhibits the representation of a house, with a cantailiver cornice.

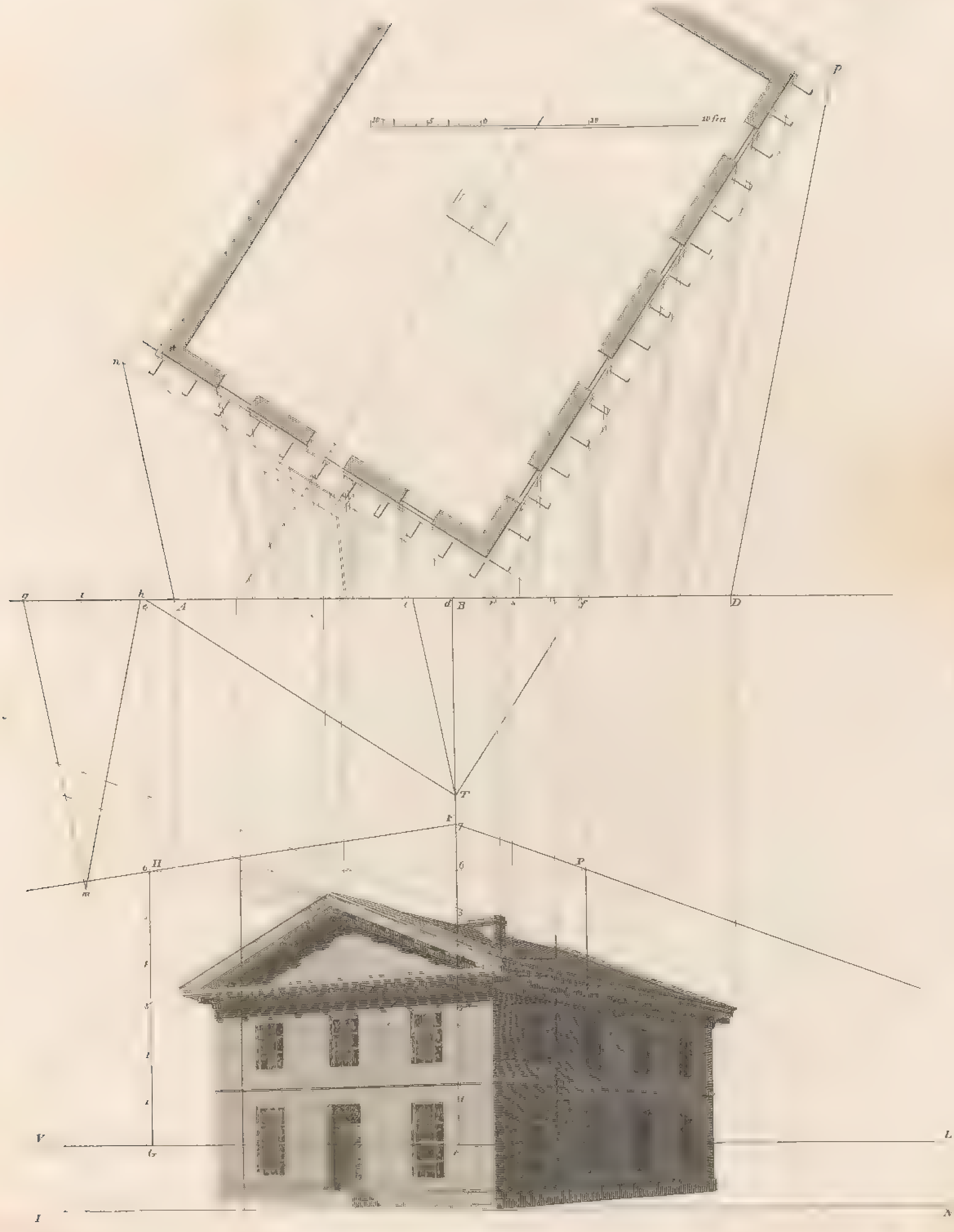
The heights of the mouldings and pediment are found from the line of heights, which is the intersection of a plane passing through the ridge of the roof: the heights of the steps may also be found from the same. The vertical lines which terminate the fronts, the breadth of the windows, and the chimney shaft, may be found from the plan, which is placed above the perspective drawing for the convenience of drawing the perpendiculars, from the intersecting line, AD, to the several terminations of the representation.

Through the oblique lines of the pediment may be drawn the two ends of each inclined cornice. They will, however, be more elegantly found by means of Problem 14.

Ex. 23.—*Plate, Perspective Grecian Doric.* This plate is a representation of the Grecian Doric capital and entablature in perspective, with a geometrical outline of the mouldings. It illustrates the use of perspective, in showing the manner of finishing the parts of this chaste and simple order, in a case where it is difficult to render it intelligible by geometrical drawings alone. A good perspective representation has nearly the same advantages as a model in such cases.

Ex. 24.—*Plate, Ionic Capital in Perspective.* This is another example of the use of perspective in elucidating the disposition of parts, which are often not clearly understood by those who have not an opportunity of examining good specimens of the orders.

Ex. 25.—*Plate, Corinthian Order.* It is evident from the principles of Perspective, that there is only one point from whence a picture can be seen in its true form, and that point is the point of sight. (*Def.* 3.) If the point of sight be made too near to the plane of the picture, the eye cannot take in all its parts at once; and, consequently, the picture cannot produce an agreeable effect as a whole. The representation is also distorted and unnatural, from the parts diminishing too rapidly. The distance of the point of sight, from the plane of the picture, which is best suited to the power of the eye, is between two and three times the breadth of the picture. The distance most commonly adopted by artists of taste, is about two and a half times the breadth.



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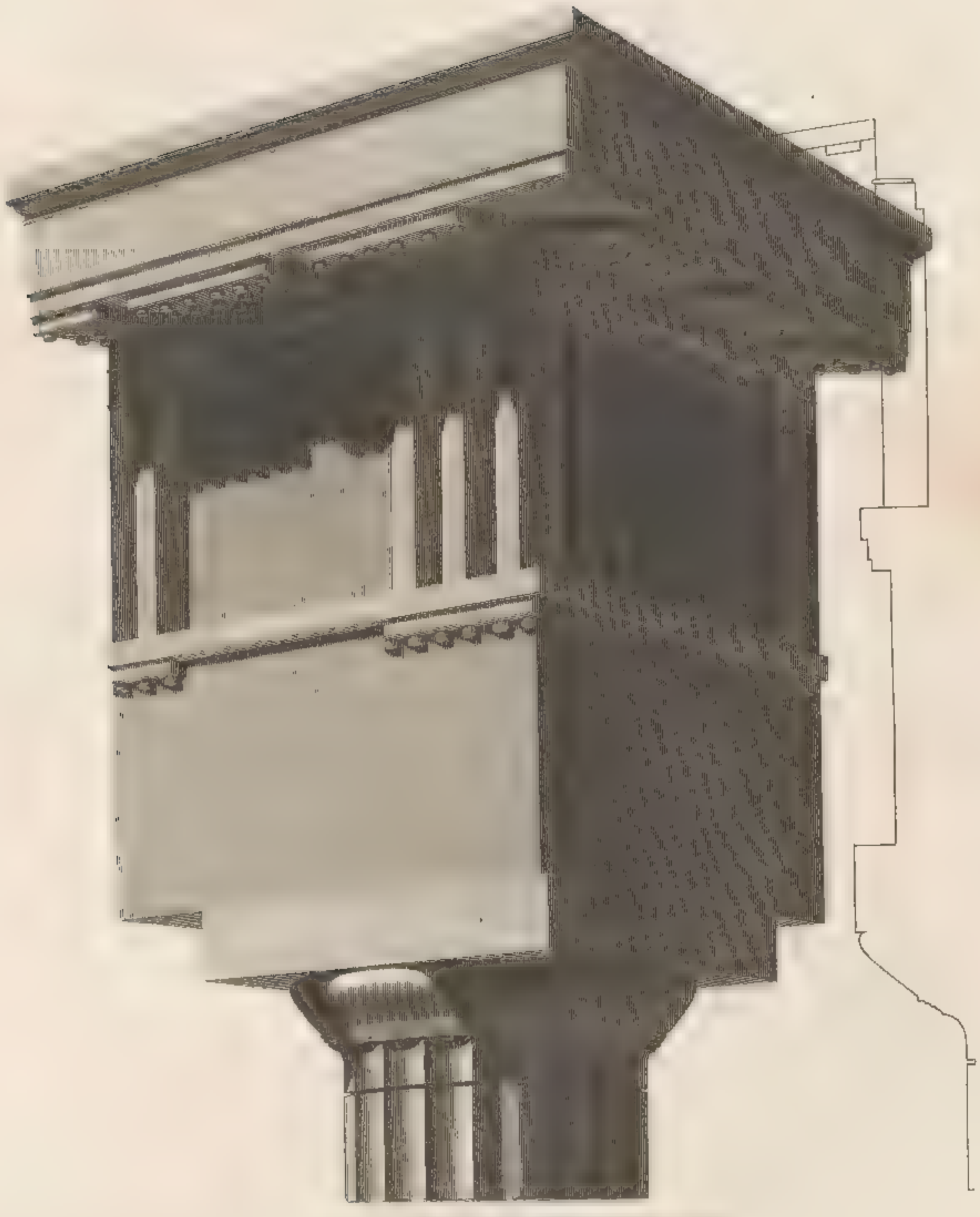
PERSPECTIVE

GRECIAN DORIC.



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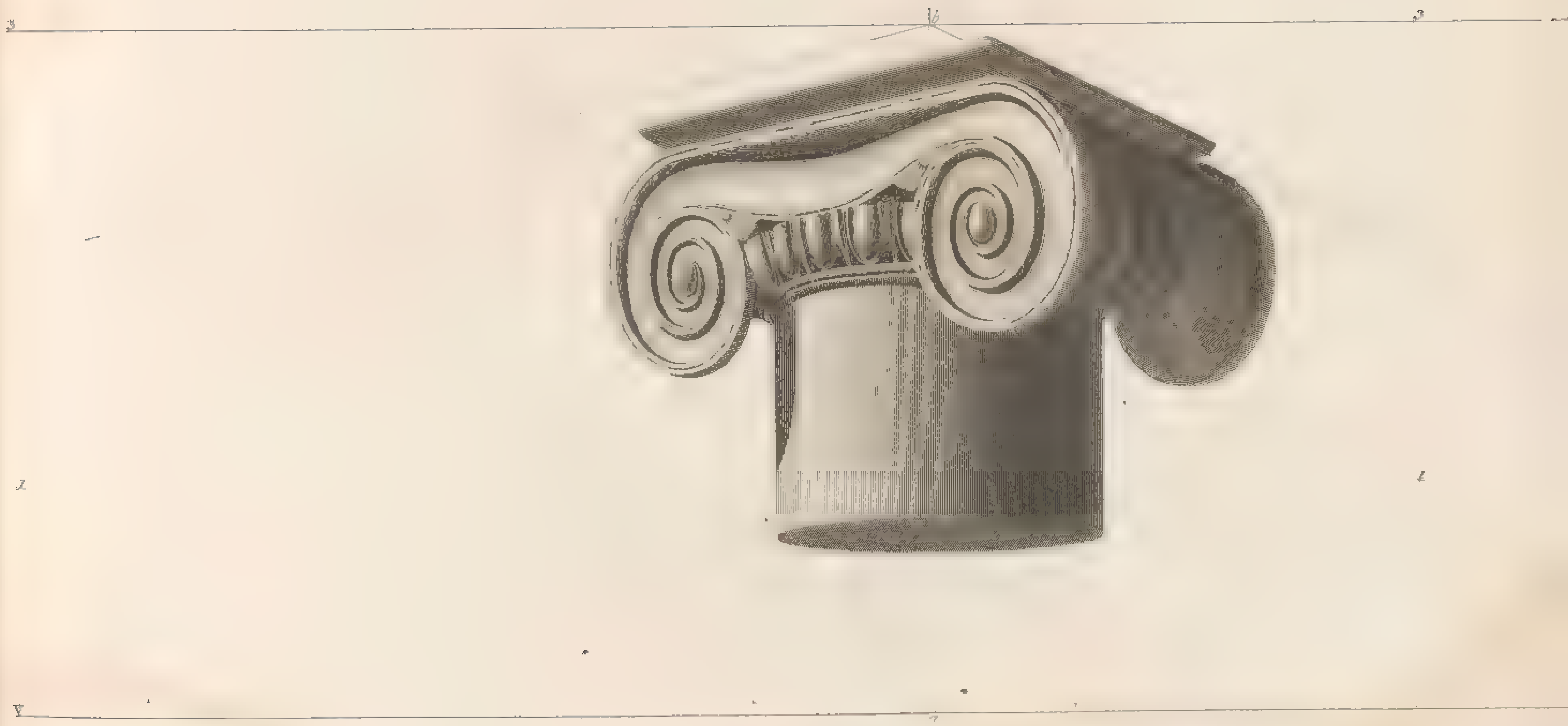
IONIC CAPITAL IN PERSPECTIVE.



CORINTHIAN ORDER IN PERSPECTIVE,

FROM THE TEMPLE OF JUPITOR STATOR AT ROME.

PROJECTION.

The most useful kinds of architectural drawing depend upon the Theory of Projection, and, consequently, its principles ought to form a part of that stock of knowledge which is essential to a student in architecture.

Some of the principles of projection are so easily comprehended, that they are acted upon without previous study; others are so difficult, that few are competent to apply them. For example, the plan of a building is a projection of it on a horizontal plane; and an elevation of a building is its projection on a vertical plane. In these simple operations no difficulties occur; but there are many cases which arise in carpentry, joinery, and masonry, where a profound experience in projection is required.

To a workman, skill in projection is a great acquisition; it enables him to form a clear conception of intricate forms, and to foresee how different parts will join or connect with each other. It enables him to understand drawings and designs with readiness, and to work to them with certainty and accuracy.

The doctrine of shadows depends on the principles of projection, and the advantage of knowing how to shadow properly is so evident that we need not say more on the subject.

But there is another application of the art of projection which is less generally understood, that is, as a mode of representing such objects as are always caricatured in attempting to draw them in perspective. To this class of objects belong all *small* models, machines, pieces of furniture, and the like; for such objects, projection is the most simple and convenient mode of representation.

Maps and plans, of various kinds, are drawn by the rules of Projection; and the use of these rules is extensive in many arts and sciences. We shall, however, confine ourselves to its principles and application to architectural subjects.

DEFINITIONS.

1.—If a perpendicular be let fall from a point to a plane, the place where the perpendicular meets that plane is the *projection* of that point.

Hence, as lines, surfaces, and solids, may be conceived to be composed of points, they may be projected upon a plane.

2.—*A plane of projection* is that plane on which the projection is to be made. It is also called the plane of representation.

3.—When a projection is made on a horizontal plane, it is called the *plan* of the object.

4.—When the projection is made on a vertical plane, it is called the *elevation* of the object.

5.—When the projection exhibits an object, as it would appear if cut by a vertical plane, the representation is called a *section.*

6.—A *primitive plane* is that which contains a point, a line, or a plane surface, of a given object.

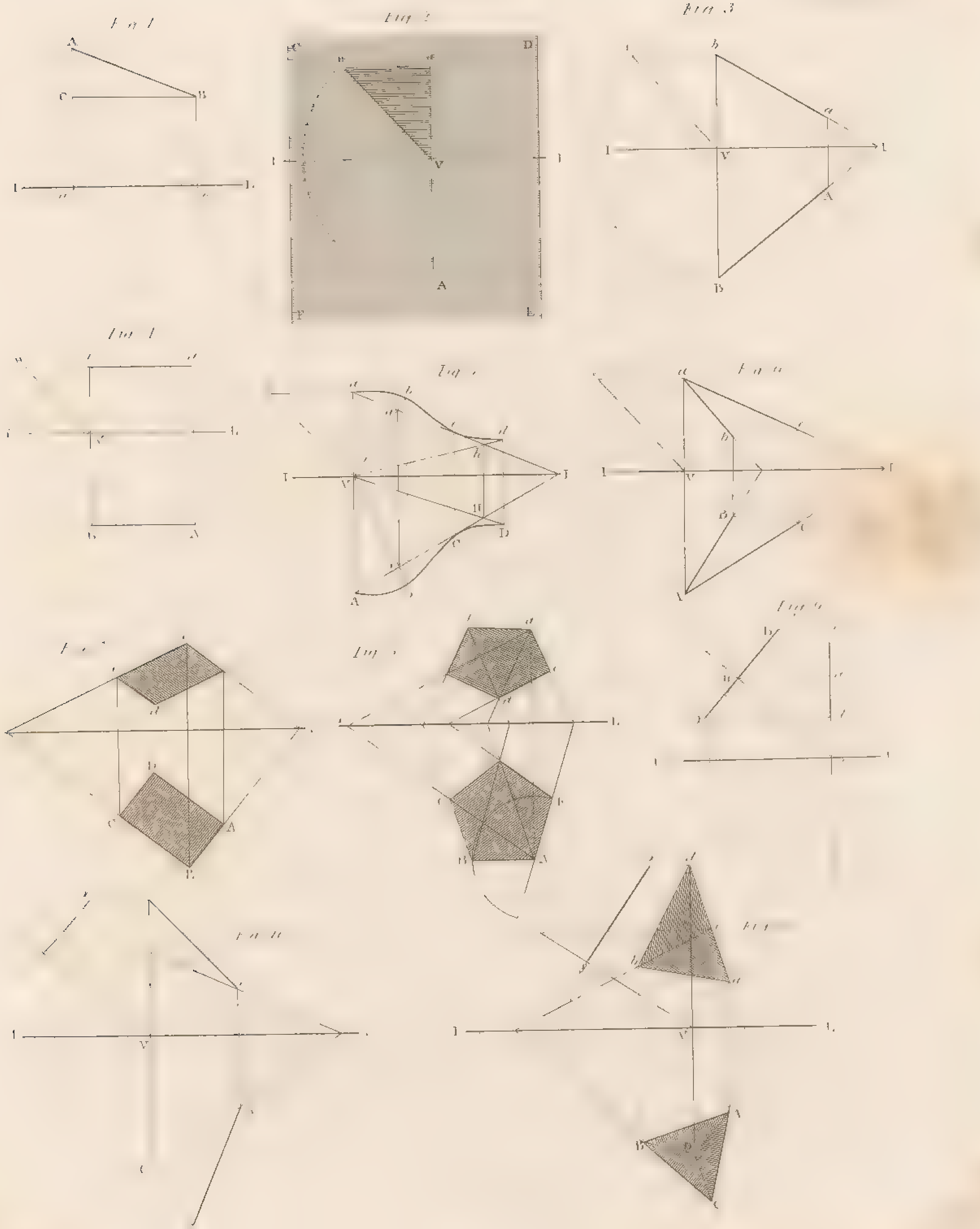
PROPOSITION.

The projection of a straight line is a straight line. If the given straight line be parallel to the plane of projection, it is projected into an equal straight line; but, if the given line be inclined to the plane of projection, the given straight line will be to its projection, as the radius is to the co-sine of the angle of inclination.

Solution.—Let a plane, perpendicular to the plane of projection, pass through the given straight line. The intersection of that plane, with the plane of projection, will be a straight line, (*Euclid, 3 prop.,* XI *book,*) and (*Def.* 1,) the intersection contains the projection of the given line.

From each extremity of the given line, AB, (*fig.* 1, *pl.* I,) let fall a perpendicular to the intersecting line, I L; then, the part of that line, intercepted between the perpendiculars A*a*, B*b*, is the projection of the given line. If the given line be parallel to the plane of projection, then, because the perpendiculars are parallel to each other, and the given line parallel to the intersecting line, the projection must be equal to the given line. If the given line be inclined to the plane of projection, and AB, (*fig.* 1,) be that line, IL the intersecting line, and *ab* the projection intercepted between the perpendiculars A*a* and B*b*. Draw BC pa-

PROJECTION.



H. Adlard sculp.

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rallel to IL, and the angle ABC will be equal to the angle of inclination of the given line to the plane of projection. Now AB being the radius, BC, or its equal, *ba*, is the co-sine of the angle of inclination; therefore AB is to *ab* as the radius is to the co-sine of inclination.

Cor. 1.—The projection of a straight line, perpendicular to the plane of projection, is a point.

Cor. 2.—If several straight lines, having the same inclination to the plane of projection, be projected, each of the originals will have to its projection the same ratio.

Cor. 3.—A plane angle, parallel to the plane of projection, is projected into an equal plane angle.

Cor. 4.—A plane angle, inclined to the plane of projection, is projected into an angle of which the sine is reduced in the ratio of the radius to the co-sine of inclination.

Cor. 5.—Lines which are parallel in the original are parallel in the projection.

Cor. 6.—Any plane figure, parallel to the plane of projection, is projected into an equal and similar figure.

Cor. 7.—The area of any plane figure is to the area of its projection, as the radius is to the co-sine of its inclination to the plane of projection.

Cor. 8.—The projection of a circle inclined to the plane of projection is an ellipse, of which the transverse diameter is equal to the diameter of the circle; and the conjugate diameter is to the diameter of the circle, as the co-sine of inclination is to the radius.

PROBLEMS.

Problem 1.—To find the projection of a point, situate in a plane inclined to the plane of projection in a given angle.

Let IL (*fig.* 2) be the intersecting line of the two planes, and A the given point. From A draw A*a* perpendicular to IL. Make *w*V*a* equal to the angle of inclination of the two planes, and V*w* equal to VA. From *w* draw a line parallel to IL, intersecting A*a* in *a*; then *a* is the projection of the point A.

Illustration.—Conceive DLIC to be the plane of projection, and LEFI the plane, containing the point A; and that these planes turn on the line IL as an axis. Also, let the triangle V*aw* turn on the line *a*V, as an axis, till it be perpendicular to the plane of projection DI, and turn the plane EI on IL, as an axis, till AV coincides with *w*V; then *aw* is obviously a perpendicular from the plane of projection to the given point; and therefore *a* is the projection of A.

Remark.—It is often necessary in practice to make all the projections of an object on the same sheet of paper, or on the same area; therefore, we conceive all the planes to be spread out, or laid flat in one and the same plane; and, when we wish to consider them in their true positions, we imagine them to revolve on their intersecting lines as axes. It is for this reason that Monge, a celebrated French author on this subject, very properly recommends that the intersecting lines should be drawn in a distinct manner.

Problem 2.—To find the projection of a line situate in a plane, inclined to the plane of projection in a given angle.

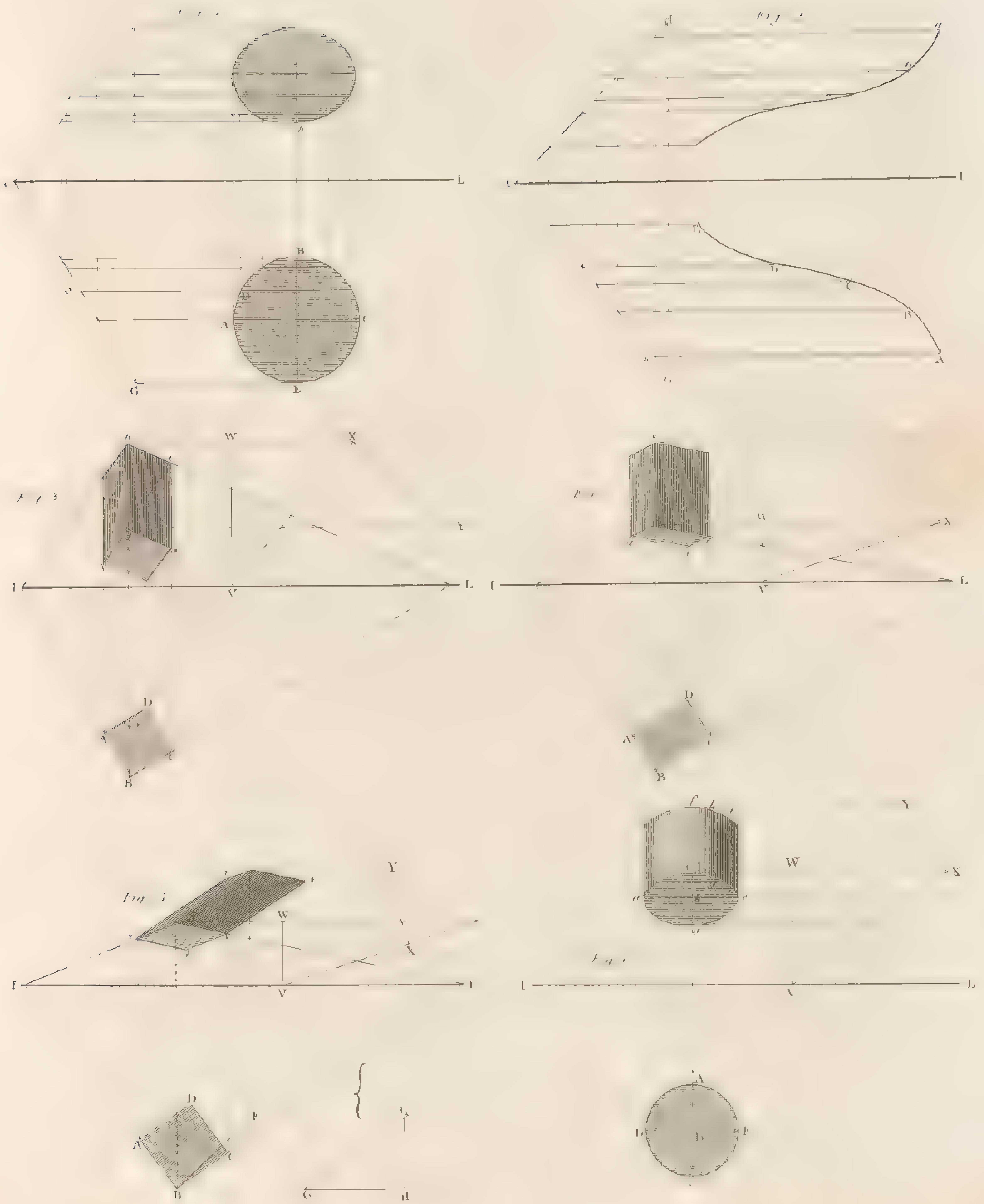
Let IL (*figures* 3 and 4,) be the intersecting line of the two planes, and AB the given line. From the extremities of AB draw A*a* and B*b*, perpendicular to IL. Make *b*V*w* equal to the angle formed by the planes, and find the projection of the point B, (as in *Problem* 1.) Then, if the line be inclined to the intersecting line, (as in *fig*. 3,) produce AB, till it meets the intersecting line IL, in L. Join L*b*, and *ab* will be the projection of AB.

If the given line be parallel to IL, (as in *fig*. 4,) from *b*, found as before, draw a line, parallel to IL, meeting A*a* in *a*, and *ab* is the projection of AB.

Problem 3.—To find the projection of a plane curve, situate in a plane, which is inclined to the plane of projection in a given angle.

Let IL (*fig*. 5) be the intersecting line of the two planes, and ABCD points in the curve, the number of which may be increased at pleasure. Draw a line, ACL, to touch the curve at C; and find the projection of this line, and of the points G, H, where it is crossed by lines drawn from D and B to V. Draw D*d*, C*c*, and B*b*, perpendicular to IL; and from V draw *h*V, *g*V, produced to meet the perpendiculars in *d* and *b*; then the points *a, b, c, d,* are the projections of the points A, B, C, D, in the curve; and a curve drawn through *abcd* will be the projection required.

Another Method.—Let IG, (*fig*. 2, *plate* II,) be a line drawn in the same plane with the curve, and let HI be the projection of that line, found by *Prob*. 2. From any point, A, in the curve, draw a line parallel to IL, cutting it in *k*. Make *kn* and A*a* perpendicular to IL, the former meeting HI in *n*. From *n* draw a line parallel to IL; and the point *a*, where it meets A*a*, is the projection of the point A. The projections of any other points, B, C, D, E, being found in the same manner, the curve drawn through them will be the projection of the given curve.



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PROBLEM 4.—To find the projection of a plane angle situate in a plane, which is inclined to the plane of projection in a given angle.

Let IL (*fig.* 6, *plate* I,) be the intersecting line, and ABC the given angle. Determine the projections of the lines AB, AC, by *Prob.* II.; and the angle *abc* will be the projection of ABC.

The projection of a plane triangle is found in the same manner, being completed by joining the points *bc*, as shown by dotted lines in the figure.

The projection of a parallelogram is also effected in a similar manner. For let the angle ABC, (*fig.* 7,) be projected by the last problem; and draw *ad* parallel to *bc*, and *dc* parallel to *ab*; then *abcd* is the projection of the parallelogram ABCD.

PROBLEM 5.—To find the projection of a pentagon, situate in a plane which is inclined to the plane of projection in a given angle.

Let the pentagon, ABCDE, (*fig.* 8,) be described by Problem 13, of *Practical Geometry*, and project the side AE by Problem II. Produce ED, AD, BD, and BC, to the intersecting line; and from the points of intersection to *a*, draw *ac* and *ad*; also, from the points of intersection, draw *db* parallel to *ea*, *ed* parallel to *ac*, and *bc* parallel to *ad*. Join *ab*; and the figure, *abcde*, is the projection of the pentagon ABCDE.

PROBLEM 6.—To find the projection of a circle.

Let IL (*fig.* 1, *plate* II,) be the intersecting line, and HI the projection of any line, GI. Perpendicular to IL draw lines, A*a*, D*d*, &c. from as many points in the circle as may be considered sufficient; and from the same points draw lines parallel to IL, to meet the line GI. From the points where these parallels meet GI, draw lines perpendicular to IL to meet IH; and parallels to IL, drawn from the points of intersection in IH, will meet the perpendiculars A*a*, D*d*, &c. in the points *a*, *d*, *b*, &c. in the projection, corresponding to the points ADB, &c. in the circle.

Since the projection of a circle is an ellipse, (*Cor.* 8,) it will be sufficient to find the projection of the diameters, AC and BE; and on these diameters describe an ellipse by any of the methods given in our *Practical Geometry*. (See *Prob.* D, p. 71.)

PROBLEM 7.—To find the projection of a line perpendicular to a plane, of which the position is given.

Let IL be the intersecting line, (*fig.* 9, *plate* I,) and A the point in the given plane, to which the line is perpendicular. Draw A*b* perpendicular to IL, and make *a*V*w* equal to the angle the given plane makes with the plane of projection;

also make V*w* equal AV. Let BD, drawn perpendicular to V*w*, be the given line; and from B and D draw lines parallel to IL, cutting A*b* in the points *b* and *d*; then *bd* is the projection of the line BD.

Problem 8.—To determine the projection of a line, which is inclined in a given angle, to a plane, of which the position is given.

Let AB (*fig.* 10,) be the given line, and BAC its inclination to the primitive plane. Make BC perpendicular to AC, and AC is its projection on the primitive plane. Let *c*V*w* be the angle, which the primitive plane makes with the plane of projection, and find the projection of the line AC, by Problem II. Make *wx* perpendicular to *w*V, and equal to BC; and from *x* draw a line parallel to IL, meeting the perpendicular C*b* in *b*. Join *ab*, and it is the projection of AB.

Problem 9.—To determine the projection of a triangular pyramid, (*fig.* 11.)

Let the pyramid stand upon a plane, which is inclined to the plane of projection, in the angle *o*V*w*, and let *xy* be its perpendicular height, and ABC the plan of its base. Project the plan of the base, by Problem 4, and draw D*d* perpendicular to IL. From *x* draw a line parallel to IL, cutting D*d* in *d*; then *d* is the projection of the vertex of the pyramid; and join *dc*, *da*, and *db*, and it completes the projection of the pyramid.

Problem 10.—To determine the projection of a rectangular prism, (*figs.* 3 and 4.)

Figure 3 supposes the primitive plane to coincide with the upper end of the prism; and *fig.* 4 supposes the primitive plane to coincide with the base of the prism; but the process is the same in both cases.

Let ABCD represent the end of the prism which is given, and find its projection, *abcd*, by Problem 4. Also, find the projection *by*, of the angle or arris of the prism, by Problem 7, XY being the height. From the point *y*, draw lines parallel to *bc* and *ba*, and complete the parallelogram *yxwv*, in *fig.* 3.

Problem 11.—To determine the projection of an oblique prism, (*fig.* 5.)

Let EGH be the inclination of the arris of the prism to its base, and BF the projection of that arris on the primitive plane. Find the projection of the base, ABCD, by Problem 4, and the projection of the arris by Problem 8, and complete the representation, as in the last Problem.

Problem 12.—To determine the projection of a right cylinder, (*fig.* 6.)

Find the projection of the base by Problem 6, and the projection of its altitude by Problem 7, as indicated by the figure.

SHADOWS.

The Theory of Shadows is founded on the supposition that light is propagated in straight lines. This supposition is not strictly true; but it does not sensibly differ from the truth in any case where we have occasion to apply it in finding shadows.

As shadows from artificial lights are seldom introduced in architectural drawings, we propose to confine our rules to those produced by the sun; and the sun's rays may be considered parallel to one another in consequence of its immense distance, compared with the distances of any objects on the earth's surface.

DEFINITIONS.

1.—Those parts of a body which receive the direct rays of the sun are said to be in *light*.

2.—Those parts of a body which do not receive the direct rays of the sun are said to be in *shade*.

3.—That part of a surface which is deprived of light, by another body intercepting the sun's rays, is said to be in *shadow*.

The doctrine of shadows has two objects, *viz.*—to determine the boundary of light and shade, and to find the form of the shadow. In architectural drawings, the breadth of a shadow is usually made equal to the depth of the projection which produces it; and an adherence to this simple rule has several advantages, besides its convenience in application; for, when it is attended to, the real quantities of projection or recession are shown by a shadowed elevation, rendering it at once ornamental and useful.

But though the shadows are equal to the projections, and the drawing is said to be shadowed at an angle of 45°, the inclination of the sun's rays to the plane of the horizon is only 35° 16′;* and it is the projection of the direction of the sun's rays against the vertical plane which make an angle of 45° with the horizon.

* For the radius is to the tangent of the sun's inclination as $\sqrt{2}$: 1. Hence, the radius being made unity, the tangent is $\frac{1}{\sqrt{2}}$; and its logarithm 0·849485, which corresponds, nearly, to the tangent of 35° 16′.

EXAMPLES.

Ex. 1.—To find the shadow of a small rod projecting at right angles, from a vertical plane.

Let *b* (*fig.* 1, *plate* IV, *Shadows*,) be the point in the plane from which the rod projects, and *a*A its plan; ZX being the base line, or intersecting line of the plan and vertical plane.

From A, draw A*c* in the direction of the sun's rays, (which is 45° in these Examples,) and raise the indefinite perpendicular *cd*. From *b* draw *bd*, in the projected direction of the sun's rays, (which is also 45° in these Examples,) intersecting *cd* in *d*; then *bd* will be the shadow of the rod.

Ex. 2.—To find the shadow of a vertical plane, situate at right angles to the vertical plane on which it forms the shadow.

Let AB, (*fig.* 2,) be the plan of the plane, and *ab* its elevation. Draw B*c*, A*d*, in the direction of the sun's rays; and from *c* and *d* raise vertical lines. From *b* draw a line in the projected direction of the rays, cutting the vertical lines in *e* and *f*; and *cefd* will be the boundary of the shadow against the vertical plane.

Ex. 3.—To determine the shadow which a rectangular plane will form against a wall, when the plane is inclined to the wall.

Let AB, (*fig.* 3,) be the plan of the plane, and *aahb* its elevation. Draw A*c*, B*d*, parallel to the direction of the sun's rays, and raise vertical lines from *c* and *d*. From *a* and *h* draw lines parallel to the projected direction of the rays, cutting the vertical lines in *e*, *f*. Join *ef*, and *cefd* is the boundary of the shadow on the wall.

Ex. 4.—To find the shadow projected, by a square pillar, against a wall.

From A, B, and C, on the plan of the pillar, draw lines, parallel to the direction of the sun's rays, to the base line; and from the points thus found, in the base line, raise vertical lines. Draw lines parallel to the projected direction of the sun's rays from the points *g*, *h*, in the elevation, meeting the vertical lines in *n*, *m*, and *s*. Join *nm* and *ms*, which determine the boundary of the shadow.

The shadow of a triangular prism, (*fig.* 5,) is found by the same process, as will be obvious from the lines on the figure.

Ex. 5.—To find the shadow, projected against a wall, by a square pillar, with a square abacus or cap, and also the shadow of the cap against the pillar, (*fig.* 6.)

Draw lines, parallel to the direction of the sun's rays, to the base line, from the points A, D, and C, in the plan of the cap; and from the points E, H, in the plan

SHADOWS.

Drawn by M. A. Nicholson.

Engraved by R. Roffe.

London, Published by Thos. Kelly, 17, Paternoster Row, Sept 1, 1823

of the pillar, extending the lines which pass through the points H and E, till they meet the plan of the cap. From each of the points thus found in the base line, draw indefinite vertical lines. Draw a vertical line from the point L, and also from the one adjoining E, to meet the under edge of the cap.

From these points in the under edge of the cap, and from the angles *a, d, e, r,* draw lines parallel to the projected direction of the sun's rays, which will meet the verticals in the points *m, p, o,* &c. Join these points, and the boundary of the shadow against the wall will be obtained.

From the point where the projected direction of the rays, from the under edge of the cap, cuts the angle *e* of the pillar, draw a line parallel to the edge of the cap, then join the point where this parallel meets the angle, *f*, with the point where the ray, from the part of the under edge of the cap, corresponding to L on the plan, meets the angle *h*, and the boundary of the shadow of the cap will be determined.

Figure 7 shows the lines for projecting the shadow of a horizontal cross, resting upon a square pillar; and *fig.* 8 exhibits the shadows of an entablature, supported by four square pillars.

Ex. 6.—To determine the shadow which a cylindrical abacus, or cap, casts upon its column; and also the shadow projected against a wall by the column and cap, *fig.* 9.

Let a line, perpendicular to the direction of the sun's rays, be drawn through the centre of the column on the plan; then, if vertical lines be drawn from the points where this perpendicular cuts the outlines of the column and cap, such vertical lines will determine the boundaries of light and shade; and, on the light side of these boundaries, the form of the shadow will be determined by the under edge of the cap; and on the shade side by the upper edge of the cap.

To find the shadow of any point, E, of the edge of the cap against the column, draw EG parallel to the direction of the sun's rays, and draw a vertical line from E, to meet the under edge of the cap; and one from G, upon the surface of the column. (This line is omitted in the figure.) Then, from where the vertical from E meets the edge of the cap, draw a line parallel to the projected direction of the rays to meet the vertical from G, in the point *g*, and *g* will be in the boundary of the shadow. In the same manner, several points in the boundary may be determined, and the line of shadow drawn through them.

Again, to find any point in the boundary of the shadow against the wall, as for example, the point C, draw C*d* parallel to the direction of the light; and from *d*

draw an indefinite vertical line. Since C is on the shade side, the shadow will be cast by the upper edge of the cap; therefore, draw a vertical line from C, meeting the upper edge in *c*; and from *c* draw a line parallel to the projected direction of the rays of light, meeting the vertical from *d* in the point *e*; then *e* is in the boundary of the shadow, and any other points may be found in the same manner.

The shadow projected by a square cap upon an octagon pillar is shown by *fig.* 10; also the shadow formed on a wall by the pillar and its cap.

Figure 11 exhibits the shadow cast by a square abacus on a column, and the shadow they form on a wall. In both these figures the shadows are determined, as in the preceding examples.

Ex. 7.—*Fig.* 1, *plate* III, represents the shadow projected against a wall by a balcony, with its cantalivers.

ABCD is the plan, and *ab* the elevation of the balcony, and IL the base line. From the points A, K, E, and F, draw lines parallel to the direction of the rays of light to intersect the base line, and raise indefinite perpendiculars from each of the points of intersection. Also, from the points *a, k, e, f, g,* and *h,* in the elevation, draw lines parallel to the projected direction of the rays of light, meeting the indefinite perpendiculars in the points *m, n, o, p*. Draw *ns* and *op* parallel to the base line; and when the shadow *qr* of the other cantaliver is found, by the same method as the one which is described, the boundary of the shadow on the wall will be determined.

The shadow against the end of the cantaliver is found by drawing FG parallel to the rays of light; and the ray, from the corresponding point *g*, in the elevation, meets the arris, *f*, of the cantaliver, in the boundary of the shadow, which is parallel to the edge *kh* of the balcony.

Ex. 8.—*Figure* 2 shows the shadows projected by a pedestal upon a flight of steps, both in plan and elevation.

A is the elevation, and B the plan of the flight of steps. From the points C on the plan, and *c* in the elevation, draw lines parallel to the direction of the rays of light, intersecting the lines of the steps in *f, e, d,* and E, D. The vertical dotted lines from these points determine the boundary of shadow on the plan, and on the elevation, as will be evident from the figure.

Ex. 9.—*Figure* 3 represents the shadow projected by a pediment against a wall. IL is the base line, with the plan of the pediment below it, and the elevation

Fig 1

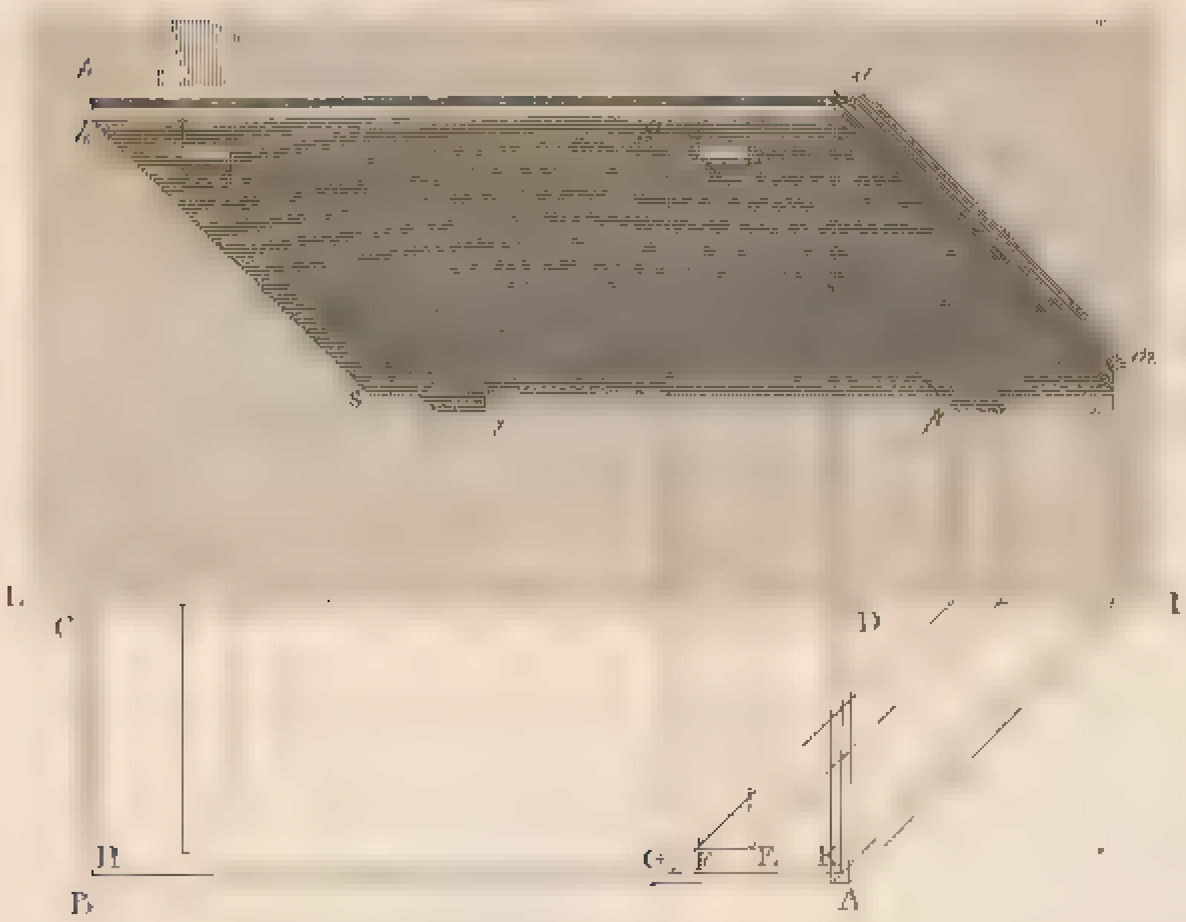


Fig 2

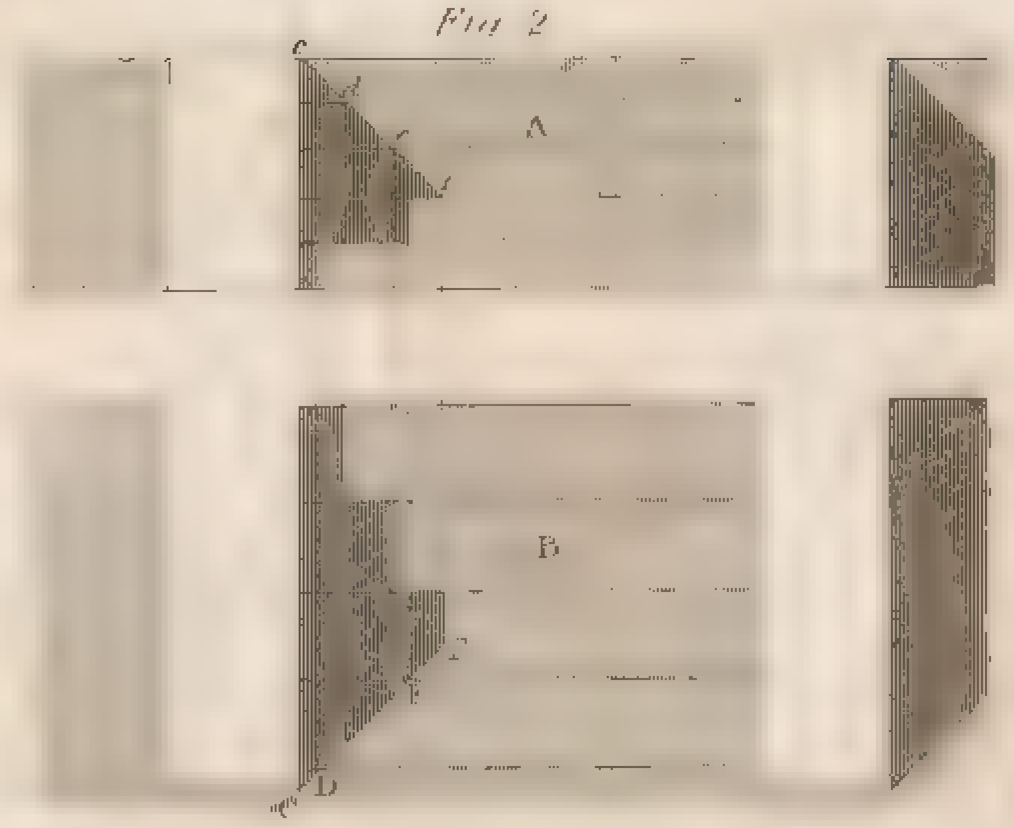


Fig 3

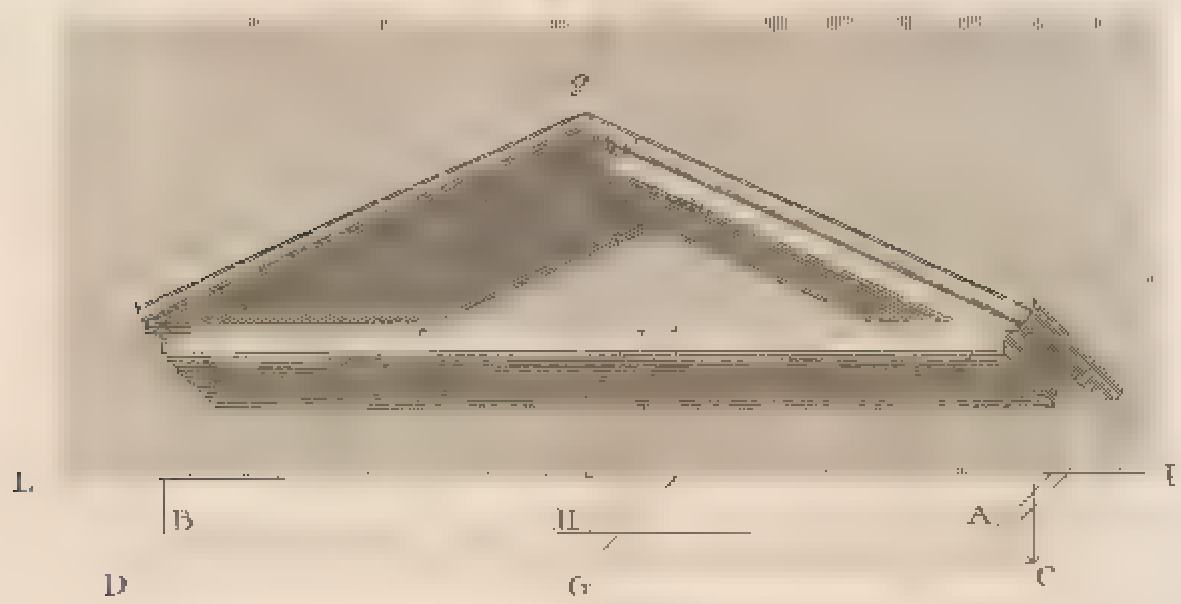


Fig 4

Fig 5

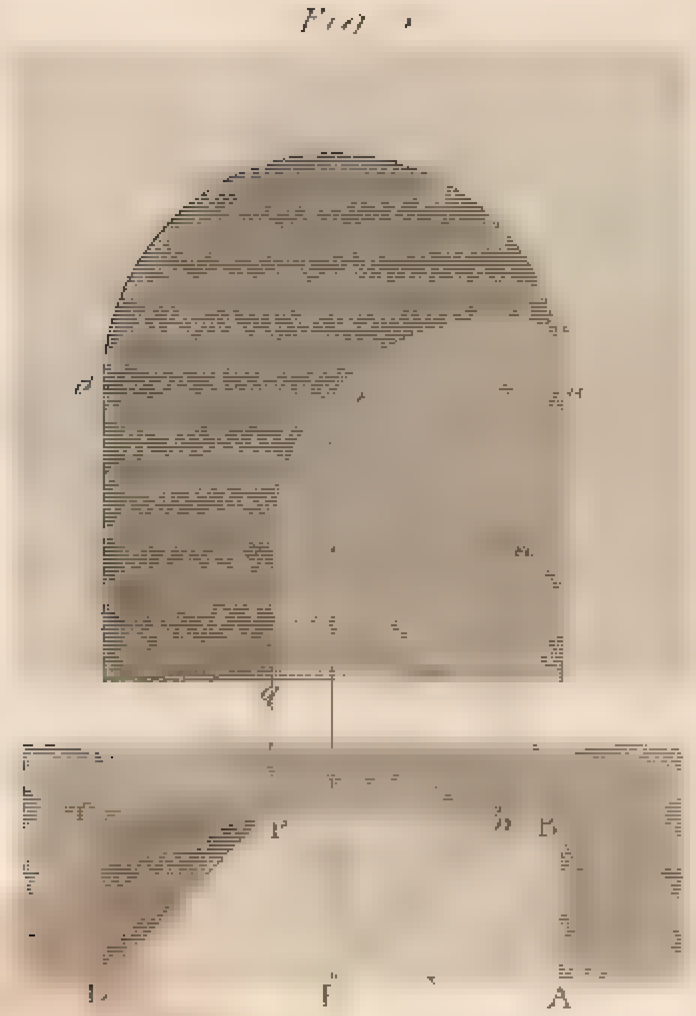
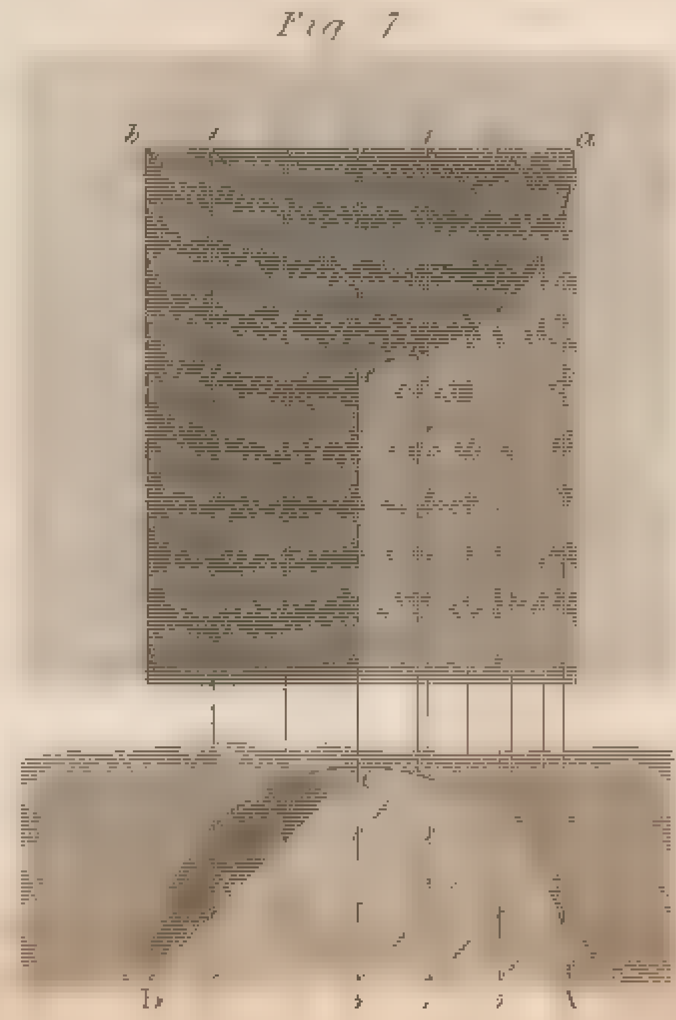


Fig 6

Fig 7



above it. It will be obvious that the shadows of the arrises of the pediment, which meet in the point *h*, are bounded by lines parallel to those arrises meeting in *n*; but when the projection of the upper members of the cornice is such that the arris *hs* is in shadow, the shadow of the under edge of the fillet *g* must be found, which is *mr* in this example. The other parts of this example being similar to the preceding ones, it is unnecessary to repeat the construction.

Ex. 10.—To find the shadow of a rectangular niche, with a semi-circular head.

ABCD (*fig*. 5,) is a plan of the niche, and *ad* its elevation. Find the shadow *m* of the point *e*, the centre of the arch; and from *m*, as a centre, describe the arc *op*, with the same radius as the arch. The rest of the process is evident from the figure.

Ex. 11.—In a portion of a pilaster, to find the shadow of the flutes in plan and elevation.

From the centre O, (*fig*.4,) draw OG perpendicular to the direction of the rays of light, then OG is the line of light and shade, and the vertical G*g* gives the point *g*, from whence the shadow in the elevation commences; and the shadows of the points, *a, d, e, f,* may be found in this manner, taking the point *e* for example.

Draw E*i* and *ek* parallel to the directions of the rays; and from *i* draw the vertical *ik*, meeting *ek* in *k*; then *k* is the shadow of the point *e*.

The shadow of the arris *ah*, is a portion of an ellipse *cm*; for the section through AC, in the plane of the arris, is a circle, and its projection is an ellipse, of which *ch* is the conjugate, and AC the transverse diameter; and if the ellipse be described on its conjugate *ch*, the line *hm*, parallel to the direction of the light, will cut the ellipse in the point where the shadow quits it. If *cn* be drawn perpendicular to the direction of the rays, *n* is the termination of the shadow; and it may be shown that the shadow *mn*, of the arc *hn*, is also a portion of an ellipse; but a more general method is somewhat easier in practice, besides being applicable to any species of curve.

Let the shadow of any point, *v*, be required; *q* being the corresponding point on the plan. Draw *qt* parallel to the rays of light; and let *tsr* be a section through *tq*; which, in this example, is an arc of a circle, of which *w* is the centre. From *r*, draw *rs*, to make an angle of 35° 16′ with *qt*; then a perpendicular, from the point *s* to *qt*, gives the point *x*, through which the shadow passes on the plan; and if a line be drawn from *v*, parallel to the direction of the rays of light,

the point, where a vertical line from x meets that line, will be in the boundary of the shadow in the elevation.

Ex. 12.—*Figure* 6 represents the shadow thrown against the back of a circular niche by its arris.

ABC is the plan, and acb the elevation of the niche, and d the centre. Draw $d6$ perpendicular to the direction of the rays of light, then the point 6 is the termination of the shadow. From each of the points, A, 1, 2, and 3, on the plan, draw lines to the back of the niche, in a direction parallel to the rays of light; and perpendiculars, from the points where they meet the back, will meet the directions of the rays from the corresponding points, a, 1, 2, 3, in the elevation, in the boundary of the shadow. To find the shadow of any other point, as 5, let fo be drawn parallel to the direction of the light, and fr perpendicular to fo, passing through the centre D; and $5m$ parallel to fr. From the point f describe the arc om; and make mn inclined to of, in an angle of $35° 16'$. Draw np parallel to fr, and the vertical, from the point p, will meet the direction of the light, from the point 5 in the elevation, in the boundary of the shadow. Any other points in its boundary may be found in the same manner.

The shadows on the sections of domes, groins, and the like, are easily found by the same methods.

Figure 7 shows the shadow on the section of a circular room, with a level ceiling.

Having shown the methods of finding the shadows produced by the direct rays of the sun, the management of shadows, cast by reflected light on the parts of bodies in shade, will easily be obtained. The light must be considered to proceed from the reflecting surface, and the depth of shadow should be in proportion to the quantity of light it reflects. The direction of the reflected light may be determined from the well-known optical principle, that whatever angle the sun's rays make with the reflecting plane, they will be reflected in an equal angle from the plane in the opposite direction. Hence the shadows, from reflected light, are usually the reverse of the shadows produced by the direct rays of the sun; that is, if the one be cast downward the other will be cast upwards.

We shall close this part of our subject with recommending the student to study from nature. His knowledge of the geometrical description of shadows will aid him in his researches, and nature will offer him new examples to exercise his skill in geometry.

APPENDIX.—DECIMAL ARITHMETIC, &c.

DECIMAL FRACTIONS.

At what time, or by whose ingenuity, Decimal Arithmetic was first introduced, is a subject quite unknown; but the perfection which it has now attained is, doubtless, owing to modern times.

In Decimal Fractions, the integer or unit, (whether it be a unit of time, of weight, or of measure,) is supposed to be divided into ten equal parts; and each of those parts is again supposed to be sub-divided into ten equal parts, and so on to infinity, according to the powers of ten.

The integer thus divided is to be considered as the numerator of a fraction, while 10, and its successive powers, compose the denominator. Thus $\frac{7}{10}$, $\frac{7}{100}$, $\frac{7}{1000}$, $\frac{7}{10000}$, &c. to infinity.

But, in dividing by one with any number of cyphers annexed, it is usual to cut off from the dividend as many places towards the right as there are cyphers in the divisor; therefore, since the denominator of a decimal fraction is always one with some determinate number of cyphers annexed, it may be rejected in every case, and a point or period used in place of it: thus, $\frac{7}{10}$ may be denoted by ·7, and $\frac{7}{100}$ by ·07. Hence it appears, that cyphers placed to the left of a decimal fraction, decrease its value exactly in the same proportion that cyphers placed to the right of whole numbers increase their value; that is, in a porportion rising by the successive powers of 10.

The following Table will exhibit the relation between the integral and fractional scales.

Whole Numbers.					*Decimal Fractions.*					
Tens of Thousands....	Thousands......	Hundreds.......	Tens........	Units place........	Parts of Ten, or $\frac{1}{10}$ ...	Parts of a Hundred....	Parts of a Thousand...	Parts of Ten Thousand	Parts of 100 Thousand	Parts of a Million.....
5	4	3	2	1 ·	1	2	3	4	5	6

From this it appears that Decimal Fractions are really more like whole numbers than Vulgar Fractions are; and the various processes to be performed on them are precisely the same, the place of the point, or period, that marks the fraction being the only difference to be attended to.

ADDITION OF DECIMALS.

Rule.—Place the numbers under each other, according to the value of their places. Find their sum, as in whole numbers, and point off as many places for decimals as are equal to the greatest number of decimal places in any of the given numbers.

Examples.—1. Find the sum of 25·635+7·0625+32·125+·006325+·75+11·010325.

$$\begin{array}{r@{}l}
25&\cdot635\\
7&\cdot0625\\
32&\cdot125\\
&\cdot006325\\
&\cdot75\\
11&\cdot010325\\
\hline
76&\cdot589150
\end{array}$$

Where the cypher on the right-hand side of the decimal may be omitted, as it does not alter the value of the fraction.

2.—Find the sum of 376·25+86·125+637·4725+6·5+358·865+41·02.—*Ans.* 1506·2325.
3.—Find the sum of 3·5+47·25+927·01+2·0073+1·5.—*Ans.* 981·2673.
4.—Find the sum of 276+54·321+·65+112+1·25+·0463.—*Ans.* 444·2673.

SUBTRACTION OF DECIMALS.

Rule.—Subtract, as in whole numbers, and mark off the decimals, as in Addition.

Examples.—1. Find the difference between 2464·21 and 327·07643.

```
2464·21
 327·07643
2137·13357
```

2.—Find the difference between 127·62 and 13·725.—*Ans.* 113·895.
3.—Find the difference between 603·5725 and 32·0012.—*Ans.* 571·5713.
4.—Find the difference between ·65325 and ·0735.—*Ans.* ·57975.

MULTIPLICATION OF DECIMALS.

Rule.—Multiply as in whole numbers, and cut off as many decimal places from the product as are contained in both factors. If there be not so many places in the product as there are decimal places in both factors, the deficiency must be supplied by prefixing cyphers to the left-hand side of the product.

Examples.—1. Required the product of ·325 and 32·5.

```
  32·5
  ·325
  1625
  650
 975
10·5625
```

2.—Multiply ·0375 by 33·75.—*Ans.* 1·265625.
3.—Multiply ·63478 by ·8204.—*Ans.* ·520773512.
4.—Multiply ·385746 by ·00464.—*Ans.* ·00178986144.

DIVISION OF DECIMALS.

Rule.—Divide as in whole numbers; and from the right-hand side of the quotient point off as many places for decimals, as the decimal places in the dividend exceed those of the divisor. If there are not so many places in the quotient, the deficiency must be supplied by prefixing cyphers to the left of the quotient. If there be a remainder, cyphers may be annexed to the dividend, and the division continued.

Examples.—1. Divide 395·275 by 3·75.

```
3·75)395·275(105·406
     375
      2027
      1875
       1525
       1500
         2500
         2250
          250
```

Here the number 250 would recur at every step: hence the quotient figure would always be the same, and this kind of decimal is said to repeat. Whence the appellation of repeaters.

2.—Divide 234·70525 by 64·25.—*Ans.* 3·653.
3.—Divide 217·568 by 1000.—*Ans.* ·217568.
4.—Divide ·408408 by 52.—*Ans.* ·007854.

REDUCTION OF DECIMALS.

CASE 1.—To reduce a vulgar fraction to a decimal of equal value.

RULE.—Multiply the numerator by 10, or its power, and divide by the denominator.

EXAMPLES.—1. Reduce $\frac{1}{2}$ to a decimal fraction.

2) 1·0
·5

2.—Reduce $\frac{1}{4}$ to a decimal fraction.

4) 1·00
·25

3.—Reduce $\frac{1}{5}$ to a decimal fraction.

5) 1·0
·2

4.—Reduce $\frac{1}{8}$ to a decimal fraction.

8) 1·000
·125

Note.—What number of cyphers more than one we have to annex before the division succeeds, so many cyphers must be placed on the left side of the first significant figure in the quotient.

EXAMPLES.—1. Reduce $\frac{1}{16}$ to a decimal fraction.

16) 1·00 (·0625
96
40
32
80
80

2.—Reduce $\frac{1}{200}$ to a decimal.

200) 1·000 (·005
1 000

Sometimes, in dividing, the same remainder successively arises, consequently the same figure must be successively obtained in the quotient; when this is the case, the decimal is called a repeater; when the repeater is not preceded by some figures that do not repeat, the decimal is called a pure repeater; but if one or more figures precede the common figure, it is a mixt repeater.

EXAMPLES.—1. Reduce $\frac{1}{3}$ to a decimal fraction.

3) 10
·333, &c. a pure repeater.

2.—Reduce $\frac{1}{6}$ to a decimal fraction.

6) 1
·166, &c. a mixt repeater.

It sometimes also happens, that a certain number of figures recur, in this case the decimal is called a circulating one.

EXAMPLES.—1. Reduce $\frac{1}{7}$ to a decimal fraction.

7) 1·000000
·1428571, &c. a circulating decimal.

2.—Reduce $\frac{1}{11}$ to a decimal fraction.

11) 100 (·0909, &c. a circulate.

EXAMPLES.—1. What is the decimal value of $\frac{3}{8}$?—*Ans.* ·375.
2.—What is the decimal value of $\frac{1}{25}$?—*Ans.* ·04.
3.—Reduce $\frac{3}{192}$ to a decimal?—*Ans.* ·015625.
4.—Find the decimal value of $\frac{275}{3842}$?—*Ans.* ·071577, &c.

CASE 2.—To reduce numbers of one denomination to decimals of another denomination retaining the same value.

RULE.—Reduce the integer to the same name with the given number, and divide the lesser by the greater, annexing cyphers to the dividend for the decimal.

Examples.—1. Reduce 9 shillings to the decimal of a pound.

$$\begin{array}{r} 1 \\ 20 \\ \hline 20 \text{ shillings.} \end{array}$$

$$\tfrac{9}{20} = \cdot 45 \text{ of a pound.}$$

2.—Reduce 2 feet 6 inches to the decimal of a yard.

$$2 \text{ ft. } 6 \text{ in.} = 30 \text{ inches.}$$
$$3 \times 12 = 36 \text{ inches.}$$
$$\tfrac{30}{36} = \tfrac{5}{6} = \cdot 83\dot{3}, \text{ \&c.}$$

3.—Reduce 6 inches to the decimal of a foot.—*Ans.* ·5.

4.—Reduce 9*d.* to the fraction of a shilling?—*Ans.* ·75.

Case 3.—To value any given decimal in terms of the integer.

Rule.—Multiply the decimal by the number of parts in the next less denomination, and cut off as many places for the right hand as there are places in the given decimal for a remainder.

Multiply this remainder by the number of parts in the next inferior denomination, and cut off the same number of places as before, and so on.

Examples.—1. What is the value of ·625 of a shilling?

$$\begin{array}{r} \cdot 625 \\ 12 \\ \hline 7\cdot 500 \\ 4 \\ \hline 2\cdot 000 \\ \hline \end{array}$$

Hence, $7\tfrac{1}{2}d.$ is the equivalent of ·625 of a shilling.

2.—What is the value of ·75 feet?—*Ans.* 9 inches.

3.—What is the value of ·125 feet?—*Ans.* $1\tfrac{1}{2}$ inch.

4.—What is the value of ·037·5£?—*Ans.* 9*d.*

5.—What is the value of $\cdot 33\dot{3}$ feet?—*Ans.* 4 inches.

Note.—In those cases where repeaters occur, the steps are precisely the same as in finite decimals, only observing to carry for each 9 when operating on the first repeating figure.

DUODECIMAL ARITHMETIC.

As dimensions are generally taken in feet and inches, which are divided and subdivided by 12, and its powers, a peculiar kind of Arithmetic, adapted to subdivision by 12, is used by Artificers in computing the contents of their work; it is called Duodecimals, or Cross Multiplication.

To Multiply Feet, Inches, &c. by Feet, Inches, &c.

Rule.—Under the multiplicand, write the corresponding denominations of the multiplier.

Multiply each term in the multiplicand, beginning at the lowest, by the feet in the multiplier, and write the result of each under its respective term, observing to carry an unit for every 12 from each denomination to that next superior.

In the same manner, multiply all the multiplicand by the inches in the multiplier, and set the respective results one place removed to the right of those in the multiplicand.

Do the same with the seconds, and other lower denominations, and the sum of all the partial products will be the answer.

Examples.—1.—Multiply 6 ft. 3 in. 9 sec. by 6 ft. 9 in. and 3 sec.

ft.	*in.*	*sec.*		
6	3	9		
6	9	3		
37	10	6		
4	8	9	9	
	1	6	11	3
42	8	10	8	3

2.—A garden wall is 254 feet long, 12 feet 7 inches high, and 3 bricks thick: how many rods are in it? *Ans.* 23 rods and 136 feet.

3.—A room is to be ceiled, whose length is 74 feet 9 inches, and width 11 feet 6 inches: what will it come to at 3*s.* $10\tfrac{1}{2}d.$ per yard?—*Ans.* £18. 10*s.* 1*d.*

4.—If a house measures, within the walls, 52 feet 8 inches in length, and 30 feet 6 inches in breadth, and the roof of true pitch, or the rafters three-fourths of the breadth of the house; what will it cost roofing, at 10*s.* 6*d.* per square?—*Ans.* £12. 12*s.* 11$\frac{3}{4}$*d.*

INVOLUTION, OR THE RAISING OF POWERS.

A power is the product that arises by multiplying a number by itself as many times (wanting one) as there are units in the exponent of the power proposed.

Examples.—1. What is the fifth power of 7?

$$\begin{array}{rl} 7 & \\ \underline{7} & \\ 49 & = \text{second power.} \\ \underline{7} & \\ 343 & = \text{third power.} \\ \underline{7} & \\ 2401 & = \text{fourth power.} \\ \underline{7} & \\ 16807 & = \text{fifth power.} \end{array}$$

2.—What is the third power of 35?—*Ans.* 42875.

3.—What is the fifth power of ·015?—*Ans.* ·000000000759375.

4.—What is the fourth power of 3·7?—*Ans.* 187·4161.

The first nine powers of the nine digits being arranged in a Table, are frequently found to be of considerable use in facilitating the computation of powers.

Table of the first Nine Powers of Numbers.

1st.	2d.	3d.	4th.	5th.	6th.	7th.	8th.	9th.
1	1	1	1	1	1	1	1	1
2	4	8	16	32	64	128	256	512
3	9	27	81	243	729	2187	6561	19683
4	16	64	256	1024	4096	16384	65536	262144
5	25	125	625	3125	15625	78125	390625	1953125
6	36	216	1296	7776	46656	279936	1679616	10077696
7	49	343	2401	16807	117649	823543	5764801	40353607
8	64	512	4096	32768	262144	2097152	16777216	134217728
9	81	729	6561	59049	531441	4782969	43046721	387420489

EVOLUTION, OR THE EXTRACTION OF ROOTS.

The root of any number or power, is such a number, as being multiplied into itself a certain number of times, will produce the power proposed.

Thus, 3 is the square root of 9, because $3\times3=9$; and 8 is the cube root of 512, because $8\times8\times8=512$.

The exact root of every number cannot be determined; but, by means of decimals, we may approximate to any degree of exactness required.

The roots thus approximated are called *Surd Roots;* and those which can be exactly found, are called *Rational Roots.*

To Extract the Square Root.

Rule.—Divide the given number into periods of two figures each, pointing towards the left in integers, but towards the right in decimals.

Find the greatest square that is contained in the first period on the left hand; (setting down its root like a quotient figure in division;) subtract that square from said period, and to the remainder bring down another period for a new resolvend.

Double the root of the first square for a divisor. Find how often this divisor can be got in the dividend, omitting the first figure on the right, and set the result in the quotient, and also annex it to the divisor.

Subtract the product of this quotient figure, and the divisor so augmented from the dividend, and to the remainder bring down the next period for a new dividend.

Find a divisor, as before, by doubling the figures that are already in the root; and from these find the next figure of the root, as in the last step; and so on till all the periods be brought down.

If there be still a remainder, the root may be approximated by annexing periods of cyphers for decimals.

Note.—The reason for dividing the number into periods of two figures each, is, because the square of any single digit never amounts to more than two places. Hence there must be as many figures in the root, as there are periods of two figures in the given number.

Examples.—1. What is the square root of 1225?

```
  3) 1225 (35
     9
 65) 325
     325
     ...
```

2.—What is the square root of 723?

```
        2) 723 (26·888659
           4
       46) 323
           276
      528) 4700
           4224
     5368) 47600
           42944
    53768) 465600
           430144
   537766) 3545600
           3226596
  5377725) 31800400
           26888625
 53777309) 491177500
           483995781
           ..7181719
```

3.—Required the square root of ·0729.

```
  2 ) ·0729 (·27
       4
 47)   329
       329
```

4.—Extract the square root of ·00032754.—*Ans.* ·01809.

5.—Extract the square root of 368863.—*Ans.* 607·340092, &c.

To Extract the Square Root of a Vulgar Fraction.

Rule.—Extract the root of the numerator for the numerator of the root sought, and the root of the denominator for the denominator. Or reduce it to a decimal and proceed as before.

Examples.—1. Required the square root of $\frac{729}{1225}$.

The square root of 729 is 27, and the root of 1225 is 35, consequently, the square root of the proposed fraction is $\frac{27}{35}$.

2. Required the square root of $\frac{16}{29}$.

```
29) 160 (·5517241379, &c.
    145
     150
     145
       5

     · · · · ·
 7) ·5517241379 (·74278
     49
 144) 617
      576
  1482) 4124
        2964
  14847) 116013
         103929
  148548) ·1208479
           1188384
           · ·20095
```

3. What is the square root of $\frac{64}{81}$?—*Ans.* $\frac{8}{9}$.

4. What is the square root of $\frac{72}{98} = \frac{6}{7}$.

To extract the Cube Root.

Rule.—Separate the given number into periods of three figures each, putting a point over every third figure from the place of units.

Find the greatest cube in the first period, and set its root on the right hand of the given number, after the manner of a quotient figure in division.

Subtract the cube thus found from the said period, and to the remainder annex the next period, and call this the resolvend.

Under the resolvend put the triple root and its triple square, the latter being removed one place to the left, and call their sum the divisor.

Seek how often the divisor may be had in the dividend, exclusive of the place of units, and set the result in the quotient.

Under the divisor put the cube of the last quotient figure, the square of it multiplied by the triple root, and the triple of it by the square of the root, each removed one place to the left, and call their sum the subtrahend.

Subtract the subtrahend from the resolvend, and to the remainder bring down the next period for a new resolvend, with which proceed as before, and so on till the whole be finished.

Note.—Should there be a remainder after all the periods are brought down, the operation may be continued by annexing periods of cyphers, as in the square root.

Examples.—1. What is the cube root of 1953125?

```
                 3          1953125 (125 root.
                3           1
       Divisor 33            953     resolvend.
                               8
                             12
  12  ×3= 36                 6
  12² ×3=432                 728     subtrahend.
  Divisor  4356              225125  resolvend.
                                 125=5³
                                900 =5²  ×12×3
                              2160  =12²×  3×5
                              225125  subtrahend.
```

2. What is the cube root of 146708·483 ?—*Ans.* 52·74.

3. What is the cube root of ·0001357 ?—*Ans.* ·05138.

4. What is the cube root of $13\frac{3}{5}$?—*Ans.* 2·3908.

5. What is the cube root of 27054036008 ?—*Ans.* 3002.

We shall now give a few examples to exercise the reader in the application of the square and cube roots.

Given the hypothenuse and one leg of a right-angled triangle to find the other leg.

RULE.—Multiply the hypothenuse and leg each by itself, and the square root of the difference will be the length of the other leg. (This has been demonstrated in Theorem 62, *Geometry.*)

Or thus, multiply the sum of the hypothenuse and leg by the difference of the same, and the square root of the product will be the other leg.

Example.—The length of the rafters is 18 feet, and half the width of the house 12 feet, What is the perpendicular rise of the roof?

```
18 x 18 = 324
12 x 12 = 144
          180 (13·038 feet.
          1
     23)  80
          79
   2603) 10000
          7809
  26068) 219100
         208544
          10556
```

Or thus,

```
18 + 12 = 30
18 — 12 =  6
          180 the root of which is 13·038 feet.
```

Given the two legs to find the hypothenuse.

RULE.—Multiply the two legs each by itself, and the square root of the sum will be the hypothenuse.

Example.—The perpendicular height of a roof is 13·038 feet, and the width of the house 24 feet; required the rafter?

```
            24 = 12
            2
       12 x 12 = 144
13·038 x 13·038 = 180
             1) 324 (18 feet, the rafter sought.
                1
            28) 224
                224
```

1. The diameter of a globular stone is 12 inches, What must be the diameter of another that contains 6 times the matter ?—*Ans.* 21·7, &c. inches.

RULE.—Cube the diameter and multiply by 6, and the cube root of the product is the answer.

MATHEMATICAL INSTRUMENTS, SCALES, &c., INCLUDING THE CENTROLINEAD AND CYCLOGRAPH.

THE MATHEMATICAL INSTRUMENTS, commonly included in a case, for the purposes of drawing, mostly consist of the *compasses*, with their appendages, the *steel drawing-pen*, the *pencil-holder*, with black-lead pencil, the *protractor*, or graduated semi-circle, the *plane-scales*, and *parallel-ruler*; to which are, at times, added other scales and implements, adapted to particular purposes, as in land-surveying, &c.

The use of the COMPASSES is too well known to require particular explanation. Of these there are, in the cases, two sorts; one with fixed steel points, and the other with one point fixed and the other point moveable. When the moveable point is taken off, there may be put in its place a steel drawing-pen point or a pencil-holder. The steel-pen point is put on the compasses, when it is intended therewith to describe circles, or arcs, in ink, which are to remain. Occult arcs, or such as are to be rubbed out again, are most conveniently described with the pencil-holder. The other steel-pen is used for drawing right lines from any given points, in any direction. An elucidation of the use of the compasses has been fully given under the head of PRACTICAL GEOMETRY, pages 62 to 70, &c.

The SCALE is so called from a Greek word, which signifies a wooden measure of length, and is a thin broad rule of wood, ivory, or brass, divided into different lines, of various names and use. The best and most useful scales, for architectural purposes, are represented on the plate entitled *Geometry*, *Plate* I., of the exact size in which they are usually made.* The graduations in the plate have been made with such care, that we believe it may be relied on, for practice, by such as have not the instruments at hand.

In this plate, *figure* 1 represents the PROTRACTOR OR SEMI-CIRCLE, projected in form of a parallelogram, either for laying off or measuring angles, and numbered both from right to left, and from left to right, to 180 degrees.

Figure 2, exhibits the back of the same scale, and it contains six lines of *equal parts*, with a *Decimal Diagonal Scale*, for *plotting*, or planning. The first have sub-divisions, both for decimals and inches; and the larger figures at the end of the lines show how many decimal parts are contained in one inch, as from 30 to 60. The *diagonal scale* is sub-divided to hundreth parts of one half and one quarter of an inch: its principle and use will be obvious on inspection; as it may be seen that the perpendiculars are divided into ten equal parts, and through the divisions parallel lines are drawn, of the whole length of the scale. Again, the length of the *first* division is divided both at top and bottom, into ten equal parts, and the points are connected by diagonal lines, so as to take off dimensions or numbers of two or more figures.

Examples.—If the largest divisions be taken as units, the *exterior* smaller divisions will be *tenth* parts, and the divisions in the height will be *hundredth* parts. If the larger divisions be taken as tens, the next smaller will be hundredths, and the smallest thousands, &c. Each set of divisions being tenth parts of the former ones.

To take the distance representing one and four tenths from the scale, (say the half-inch,) set one foot of the compasses on the upper line, to the larger division 1, and open the other leg to 4 in the subdivisions on the right. The extent will be the distance required.

To take a distance equal to 25, set, in like manner, one foot of the compasses on the larger division 2, and extend the other to the sub-division 5, which will be the distance.

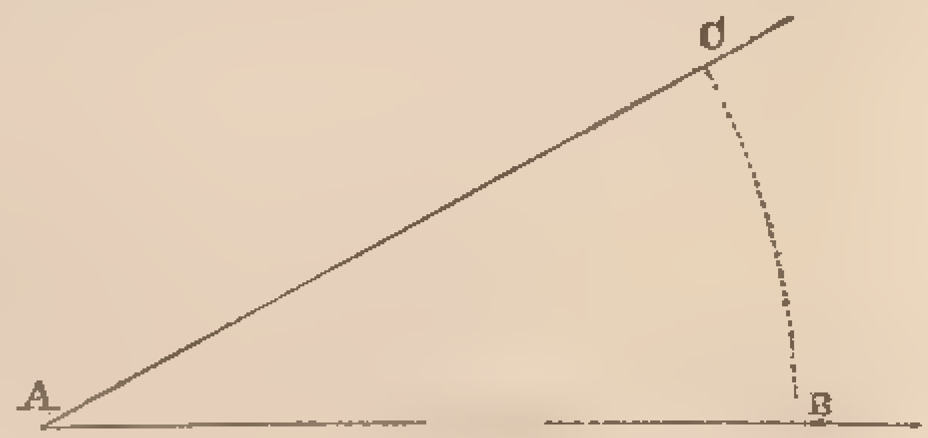
* As this plate was given in the *second* edition of the first number, those who have not received it may obtain it on application to the publisher.

For 346, the larger divisions, being in this case taken as hundredths, set one leg in 3, upon the line marked 6 at the end, and extend the other to the diagonal 4, which will be the extent required.

And, conversely, may the length of any line be measured, relatively to another of a determinate length.

Figure 3 represents the face of another plotting scale, which contains *lines of chords*, of different radii; and *equal parts, for feet and inches.* The definition of a *chord* is given in Geometry, page 13, and the lines of this name are divided for the purpose of laying off and measuring angles, on the established principle that the radius or semi-diameter of a circle is equal to the side of a hexagon inscribed in the same circle; or, in other words, to the chord of 60 degrees. Hence, by taking the extent of the chord of 60° in the compasses, applying one foot to an angular point, and sweeping an arc with the other from leg to leg, (*produced*, if required,) the exact measure of the angle may be found.

Examples.—1. *To construct an angle at the point* A, *of the line* AB, *of any number of degrees, suppose* 26.



From the line of chords take in your compasses the extent to 60; and setting one foot in A, describe the arc CB: then take 26, the number proposed, from the same line of chords, in your compasses, and set it off from B to C. Join AC, and the angle BAC will contain 26 degrees, as required.

2. *To find the quantity of a given angle, as* CAB.—This is the converse of the preceding example: for, if you take in your compasses the line AB with the chord of 60, and describe the arc BC, it becomes evident that the distance BC will be the quantity of the angle BAC; which, measured on the line of chords, will show its quantity, or the number of degrees that it contains.

3. *To describe any regular polygon in a circle.*—First find the angle of the centre, which is done by dividing 360, the number of degrees in a circle, by the number of sides of which the proposed figure is to consist: then, from the centre, draw two radii in the angle given by the quotient, and the *chord* of the angle included between them will be the side of the polygon required. Thus may any regular polygon be described, the radius being always 60°.

Figure 4 represents the back of *fig.* 3, and contains another set of plotting scales, for half an inch, one quarter of an inch, three-eighths, and one-eighth, of an inch, to the foot, &c. and sub-divided diagonally for greater accuracy. The uses of these are too clear to require further explanation.

Description and Use of the Centrolinead.

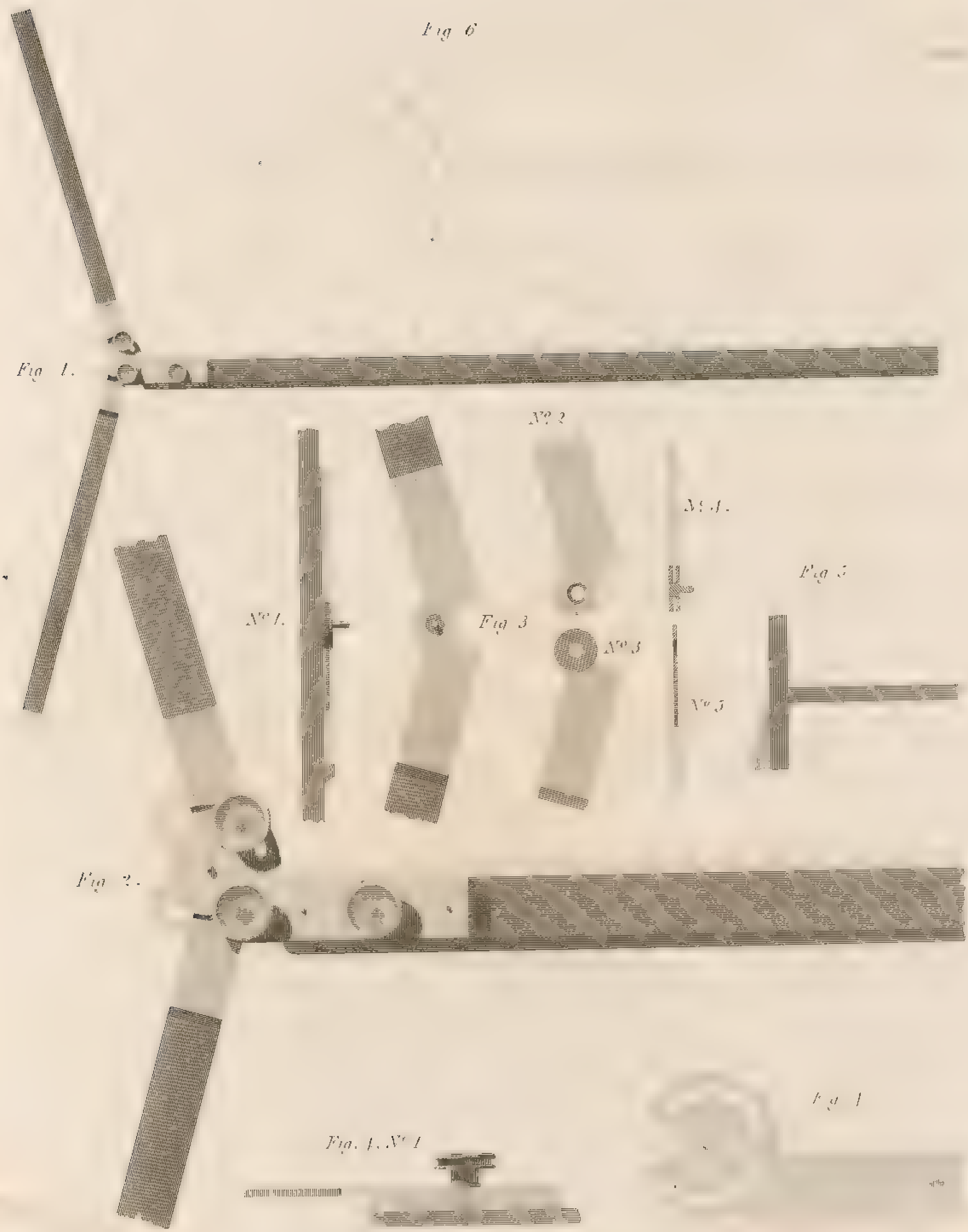
The CENTROLINEAD is an instrument used in Perspective, &c. and invented by Mr. Peter Nicholson, for drawing lines to an inaccessible or vanishing point. For this invention Mr. Nicholson was rewarded by the Society of Arts, in May, 1814, with the sum of twenty guineas; and, in 1815, for an improvement, the Centrolinead now in general use, with the silver medal.

Figure 1, of the plate entitled Centrolinead, represents the instrument now in use. It is constructed with two legs, about a foot long, with a joint in the angle, similar to a carpenter's rule. The centre of the knuckle is pierced with a small hole, (*fig.* 2,) in which a pin is rivetted, in order to admit of a blade being fitted on it, for drawing lines to a point. The drawing edge of this blade is made to pass through the centre of the joint; and the blade, screwed to the two legs, may be fixed at any required angle. The edge of the blade and the edges of the two legs, all tend to the same point. The blade is made to reverse, so as to draw lines to either side of a building: the same legs will answer to blades of various lengths, as occasion may require. In complex drawings, it will be convenient to use a distinct centrolinead for each point, to prevent the trouble of frequently adjusting the instrument

Figure 2 exhibits the instrument on a larger scale, with part of the legs and the blade broken off.

Figure 3.—The joint fixed to part of the legs. The figures No. 1, No. 2, No. 3, No. 4, No. 5, are the detail of *figure* 3.

CENTROLINEAD.



Engraved by W. Symns.

London Published by Thos. Kelly, 17 Paternoster Row Octr. 18 1823.

MODE OF SETTING THE CENTROLINEAD.

London. Published by Thos Kelly, 17 Paternoster Row April 10 1825

Figure 4.—Brass fixed to the blade and legs, by means of three screws, so as to fasten them together, as represented in *figure* 1.

Figure 4, No. 1, edge of *figure* 4, with part of the edge of the blade fixed to the brass, by a screw, and two pins to steady it.

Figure 5 shows how a T-square may be made into a centrolinead, by fixing a piece in the form of a wedge to the stock of the square.

Figure 6.—A diagram, showing the figure where the points form for working the instrument on, when the legs of the instrument are at different angles, to draw to the same vanishing point.

Mode of Setting the Centrolinead, with Screws, by Mr. P. Nicholson.

(Second Plate.)

Draw two lines tending to the vanishing-point, or to the station point, which must be found by a problem: then put two pins in vertically, over each other, on each side of the line without the space, making the distances on each side of the line nearly the same. Press the two edges of the legs, which run to the centre of the joint, against the pins, and move them along till the edge of the blade, which passes through the centre of the joint, coincides with the line or crosses it; then loosen the screw that fastens the blade to the leg of the centrolinead, and press the legs gently against the pins till the blade coincides with the line: then fasten that screw, and loosen the other; next move the instrument down to the other line; and, if the same edge of the blade coincides with the line, fasten the screw, and the instrument is set: but if not, proceed, as above, till the edge of the blade coincides with the two lines; it generally requires three settings; the least number it can have is two, that is, one for each angle. The centrolinead may be clamped at once, in the manner following: Draw a line between the two given lines, so as to be terminated by them; set each of the angles of the centrolinead to each angle formed by the cross line; put a pin in each angular point, formed by the cross line, with each of the given lines; then placing the central edges of the legs upon the pins, one on each, draw lines by the central edge of the blade, and those lines will tend as accurately to the point as if they were drawn to it by a longer ruler.

METHOD of finding two Lines tending to the Station Point, and also of getting the Vanishing Point on your Plan.

Let $ABCD$ (*fig.* 1.) be the size of your drawing board; IJ your intersecting line; and $HEFG$ the plan of the remotest projections of the cornice of your building; making the line EH, produced to e, an angle of about 43 degrees with the intersecting line IJ. Then draw a line, NM, perpendicular to IJ; at one extremity of your paper set any equal distance, ML or MK, on each side of M, and make the distance MN, equal to 3 times the base of the triangle KL, or any other number, according to the distance at which you wish to view the object: then draw EO parallel to LN; and GP parallel to KN; and these are the two lines tending to the station point W, to set the centrolinead to, which falls a considerable way without the board.

To find the vanishing points, divide OP into two equal parts, at Q; divide QO into four equal parts, and draw $1S$ perpendicular to IJ, to cut the line EW, at S; draw ST parallel to IJ, and TQ will be one fourth of the real distance W; then draw TU parallel to HG; and TV parallel to EH; then will QU and QV be each one fourth of the real vanishing points, which should be drawn from W, if it could be got within the board.

MANNER of transfering the points from your plan, or to your Picture, in order to get the two lines tending to the vanishing points; and, also, Mr. M. A. Nicholson's *method of setting the Centrolinead without screws, as shown in the Plate.*

Figure 2. Draw your intersecting line *LM*, and then your vanishing line *AB*; divide your paper into two equal parts at *C*; draw any line *CD* perpendicular to *AB*; set up any four equal parts, *CE*, a little higher than you intend your object to be; make *CG* equal to *QV*, and *CH* equal to *QU* on your plan, *fig.* 1. Draw *GF* and *HI*, perpendicular to *AB*; make *GF* and *HI* each equal to three parts of *CE*; join *EF* and *EI*, and these are the two lines tending to the real vanishing points, which should be drawn from the point *W*, to intersect the line *IJ* on the plan, *fig.* 1. Having found the two lines *EF* and *EI*, tending to the vanishing points, the next thing will be to set the centrolinead, which is done by fixing in a pin at *f*, a little below the intersecting line, then placing the blade of the instrument to the line *FE*, at the same time pressing the leg to the pin *f*: then draw a line on the side of the leg *cd*; then move the blade to the vanishing line *AB*, making *ab*, coincide with *AB*; at the same time pressing the leg *ed* to the pin *f*, as above, and drawing another line along the side of the leg *cd*, to intersect the former line *ag*; then *g* is the point for fixing in another pin, and the instrument is set, and will draw all lines on the edge of the blade *ab*, between *FE* and *AB*, to a point, by pressing the legs *dc*, and *de*, against the pins *g* and *f*.

A Centrolinead constructed in this manner, without screws, will draw lines to various inclinations, excepting when the lines are at a very sharp pitch or a very flat one; then the angle of the legs should be made accordingly. I have found, in practice, that three instruments, constructed in this manner to different angles, are sufficient to draw any building, whether octagonal or rectilinear; as the angle under which we view the building, in general, is the same, in order to make an agreeable picture.*

Description and Use of the Cyclograph.

The CYCLOGRAPH is an instrument for drawing arcs of circles, and is very useful in drawing the mouldings of the top of Bridges, &c. *Fig.* 1, of the plate entitled Cyclograph, is a representation of the instrument, which is used by placing in a point, as at *A* and *C*, at the springing of the arch, and adjusting the point of the pin or pencil, which is inserted in a tube at *B*, to the top of the arch, by means of one of the largest screws to the right hand side of the joint.

Figure 1. No. 1, is a side view of *fig.* 1, representing the tube fixed in the joint.

Figure 2, exhibits the legs without the brass-work.

Figure 3. No. 1, the brass-work, with the tube in the joint. No. 2. is a side view of *fig.* 3. No.1.

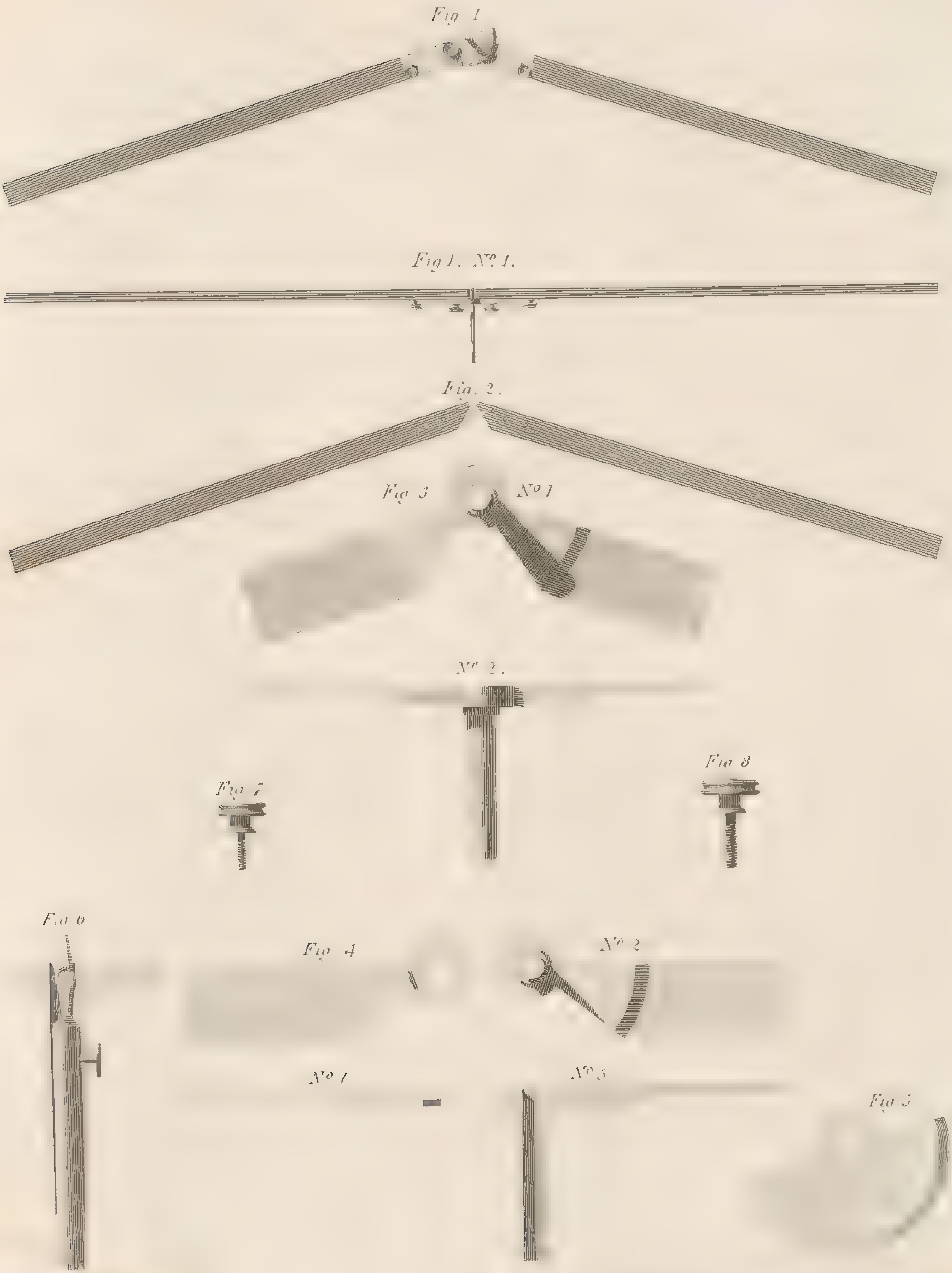
Figure 4. No. 2, exhibits the joint when the pieces are separated. No. 1, and No. 3, sections of *fig.* 4, and No. 2.

Figure 5. Brass-piece for holding and adjusting the leg by means of a slit in the brass, struck from the centre of the joint, and fastened to the leg by a screw.

Figure 6. Section of the joint and tube to a larger scale, with the drawing pin in it, and fastened by means of a screw at the side of the tube.

* Those Gentlemen who wish for the instrument, made agreeably to the above setting, may be supplied by Mr. M. A. Nicholson, on application to the Publisher of this work.

CYCLOGRAPH.

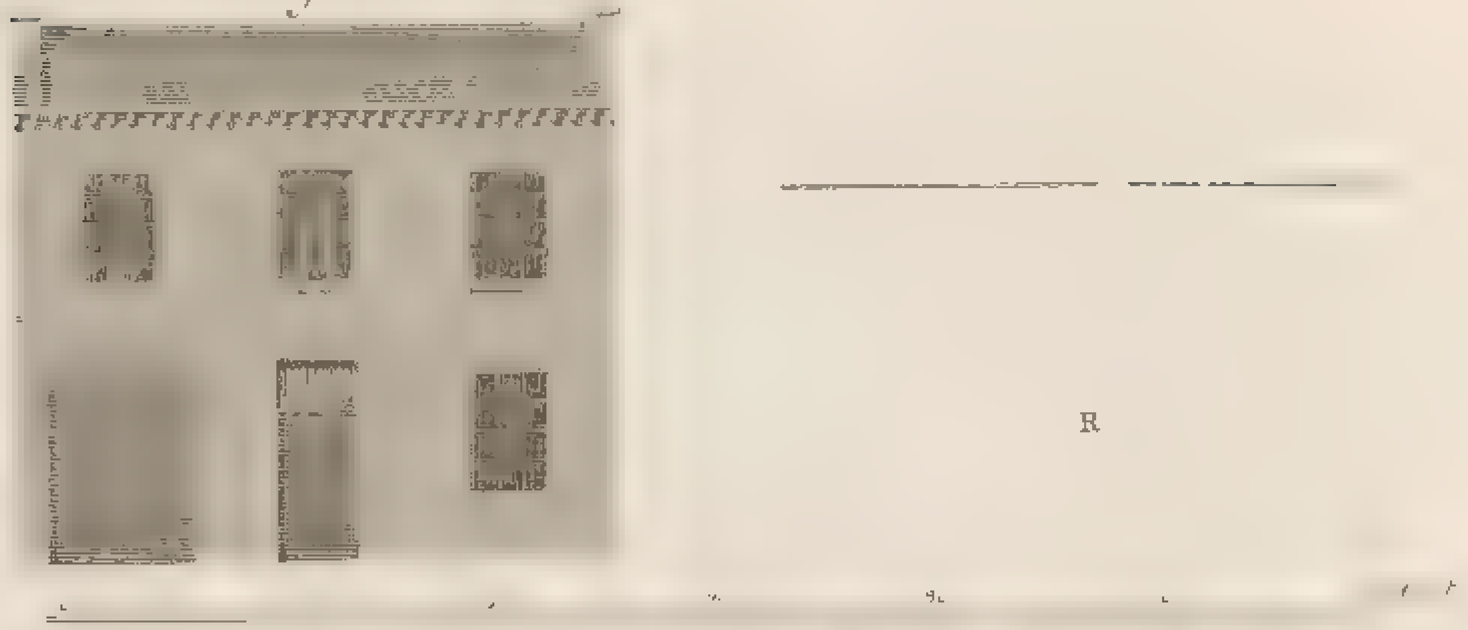


Drawn by M.A. Nicholson

London. Published by Thos. Kelly, 17 Paternoster Row, Septr. 25th 1824.

FIRST-RATE HOUSE.

Fig. 5.



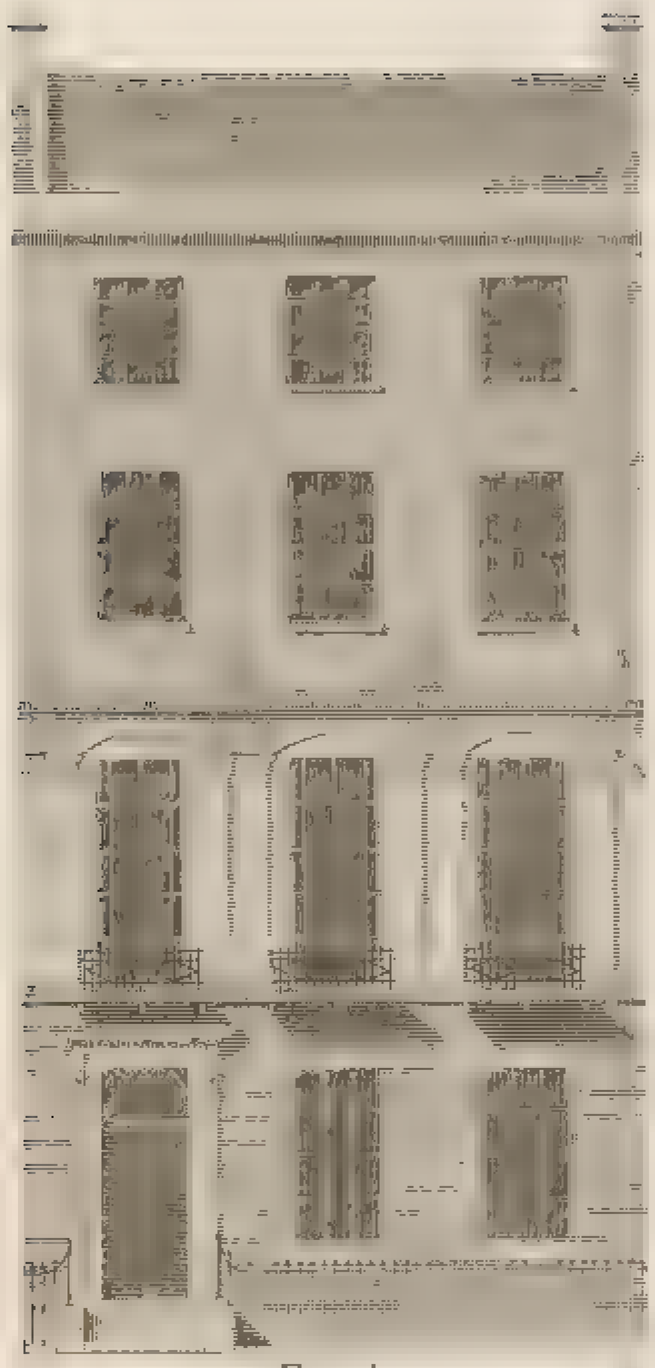


Fig 1

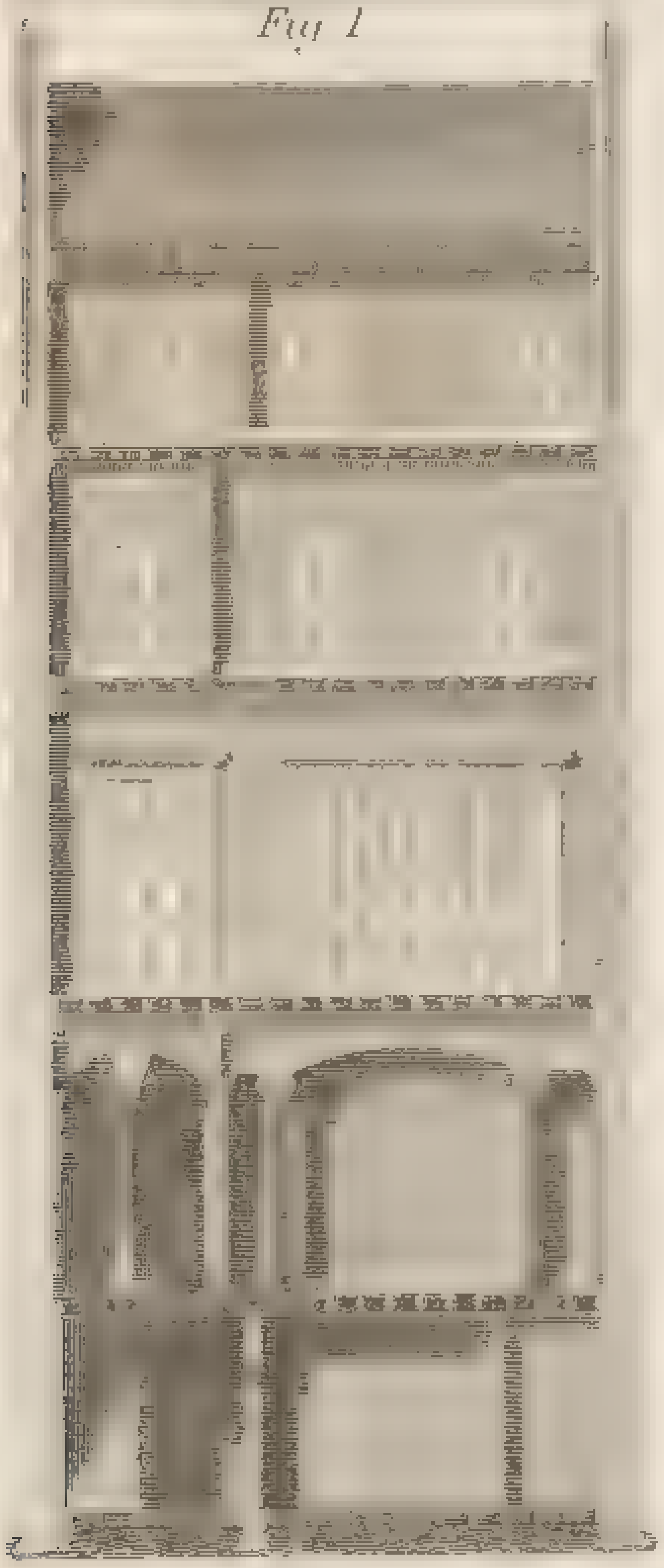


Fig 2

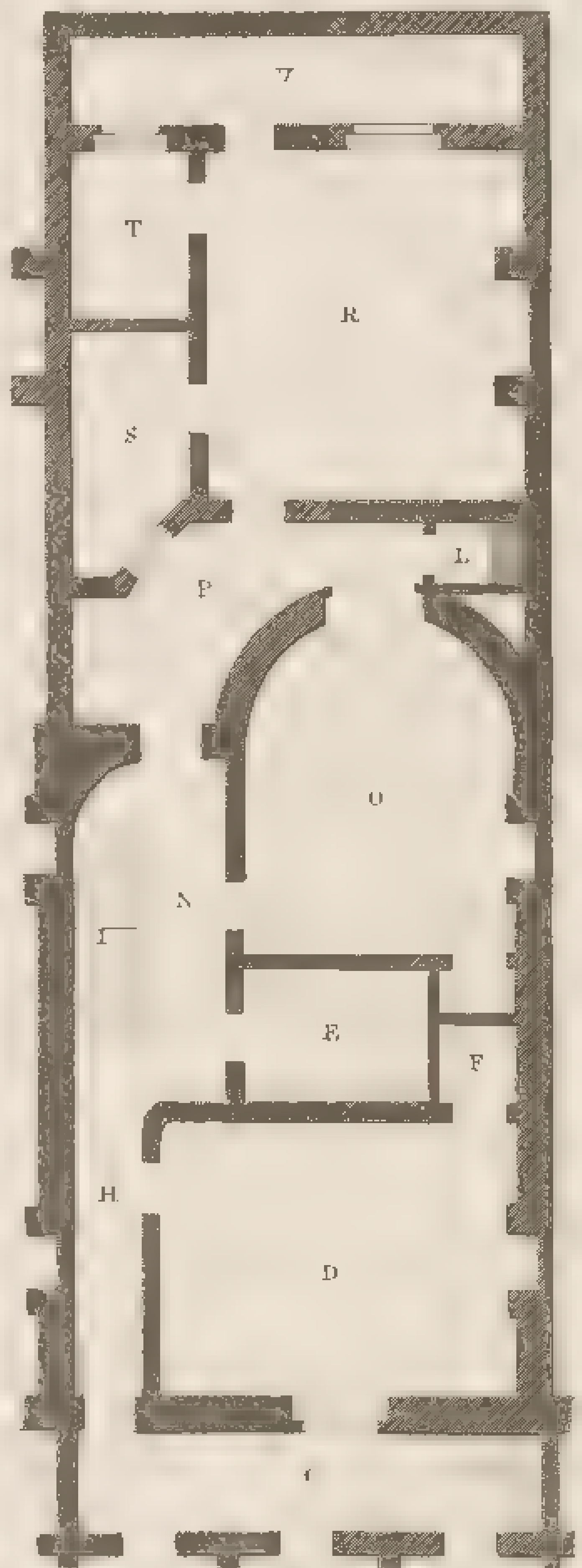
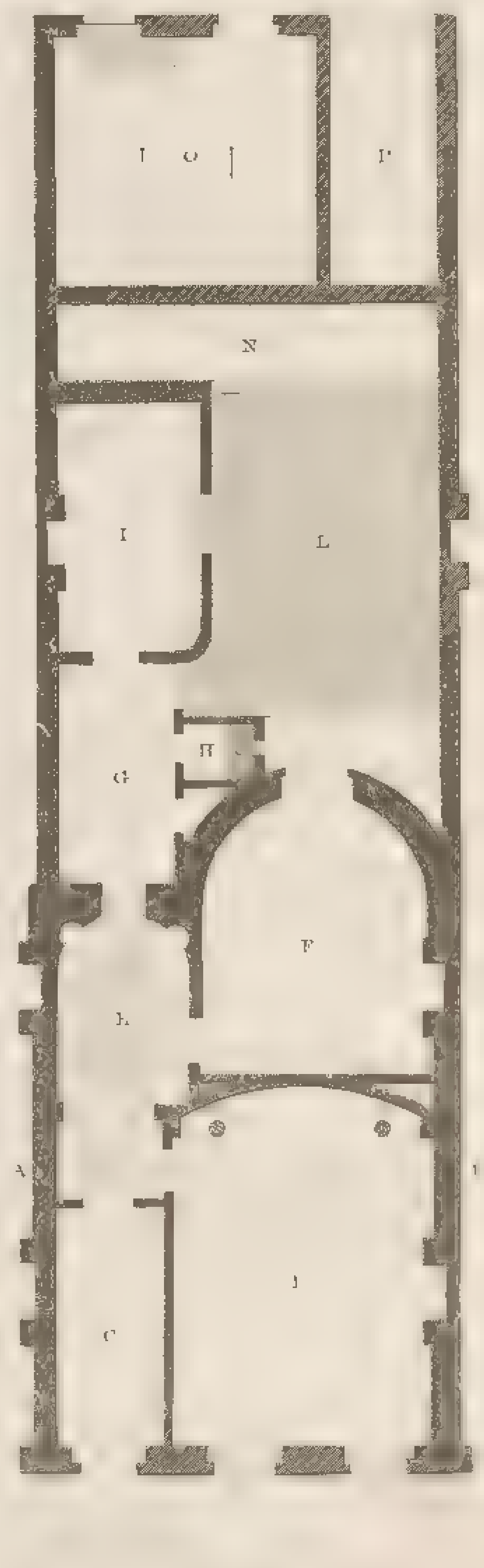


Fig 3



Designed by M.A.Nicholson.

PLANS OF FLOORS TO A FIRST RATE HOUSE.

Fig 3

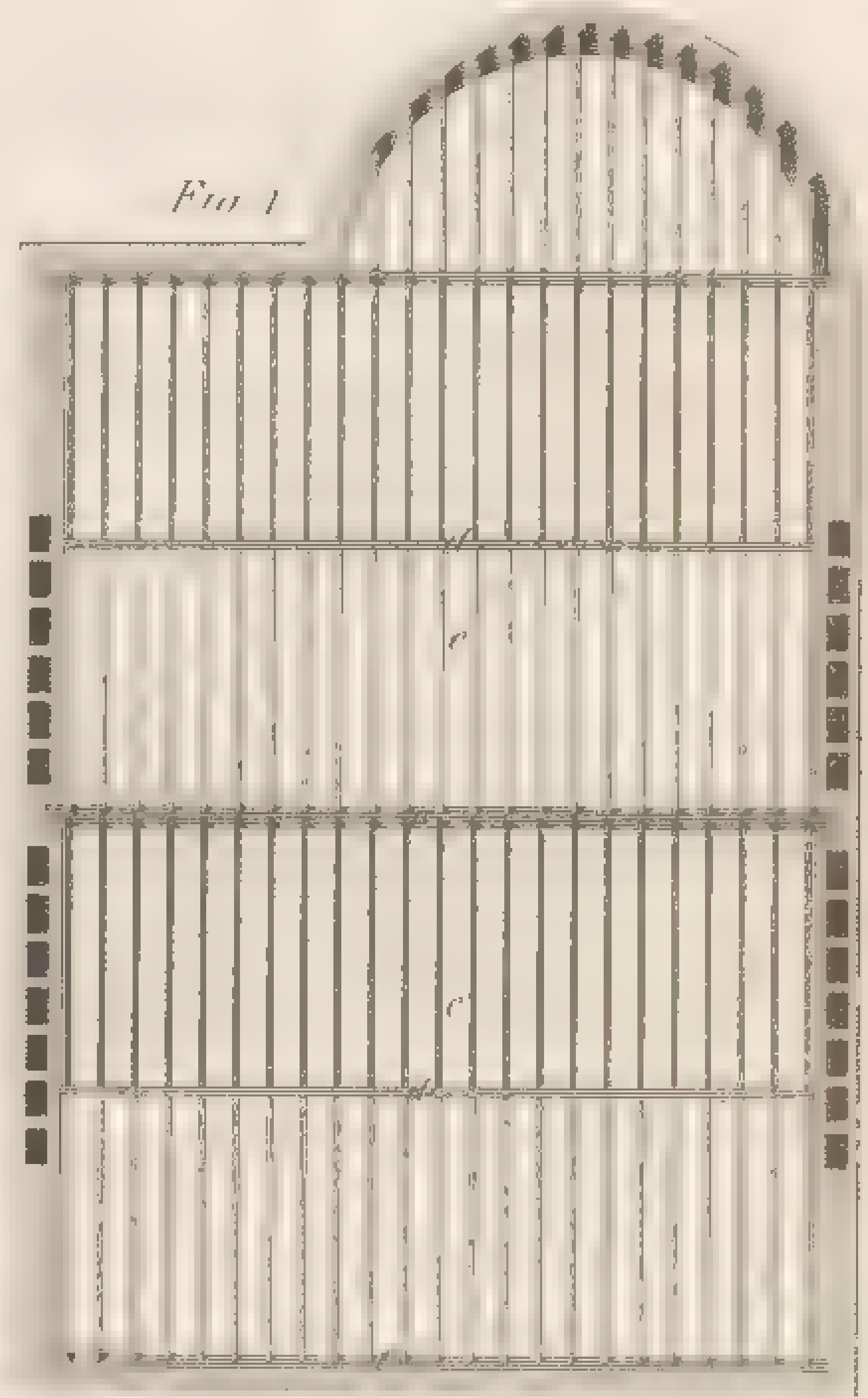


Fig 4

10 20 30 feet

Fig 1

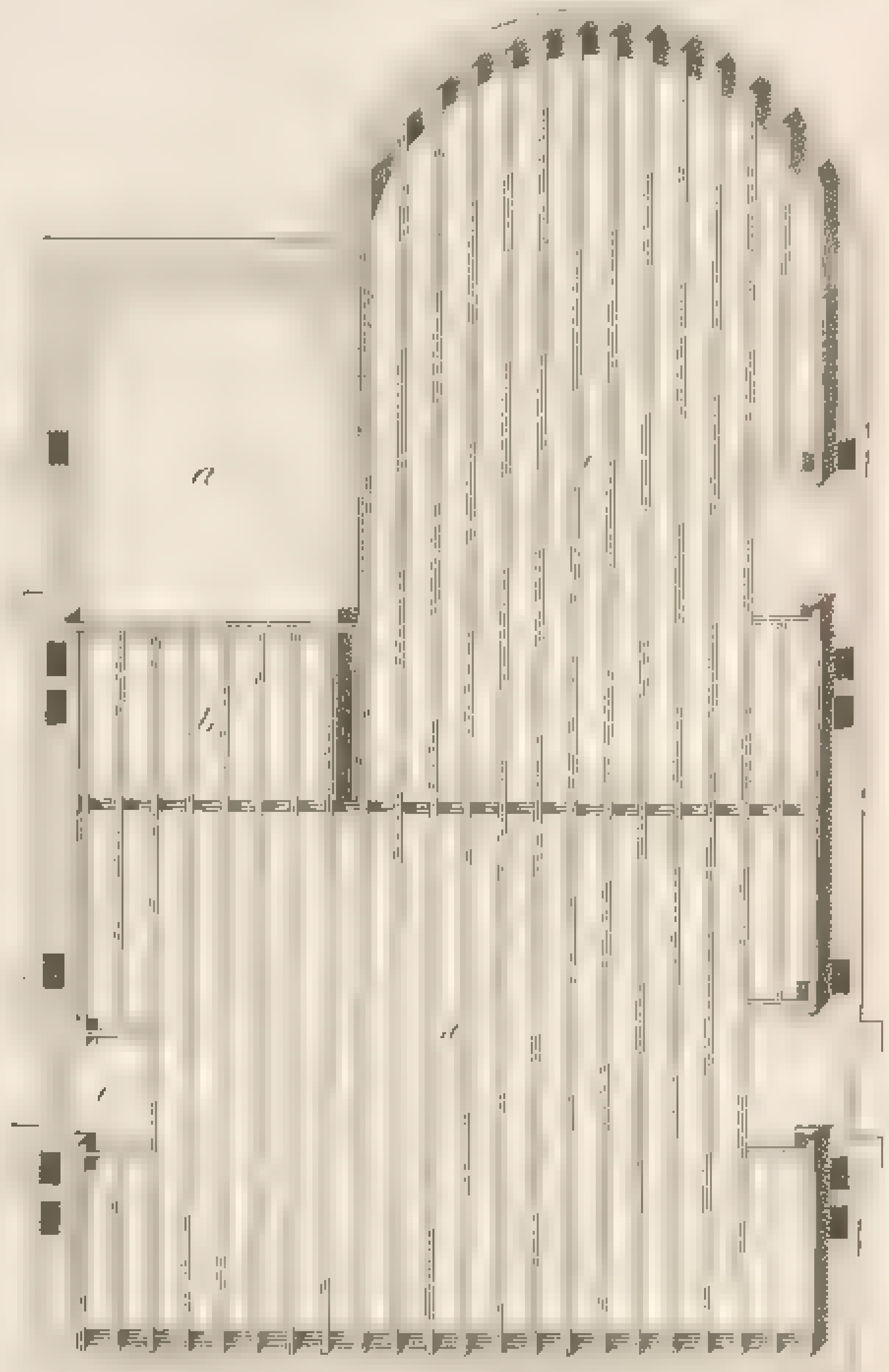
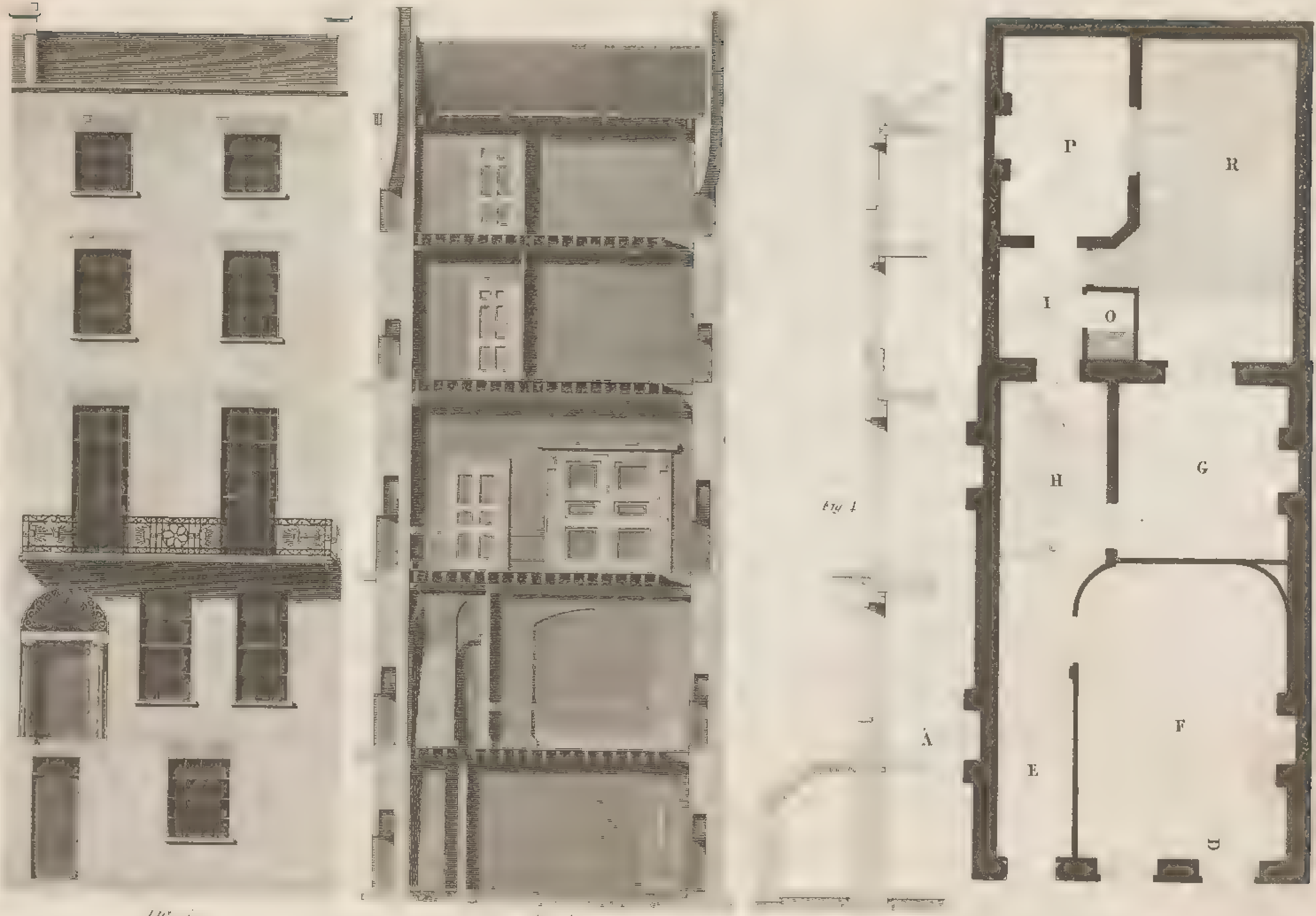


Fig 2

Designed by M. e. A.

London. Published by Thos Kelly 17 Paternoster Row, April 16 1824

SECOND RATE HOUSE.



Drawn by M. A. Nicholson

Engraved by Symns

London Published by Thos. Kelly 17 Paternoster Row, July 3rd 1824

THIRD RATE HOUSE.

PLATE IV.

Fig. 1.

Fig. 2.

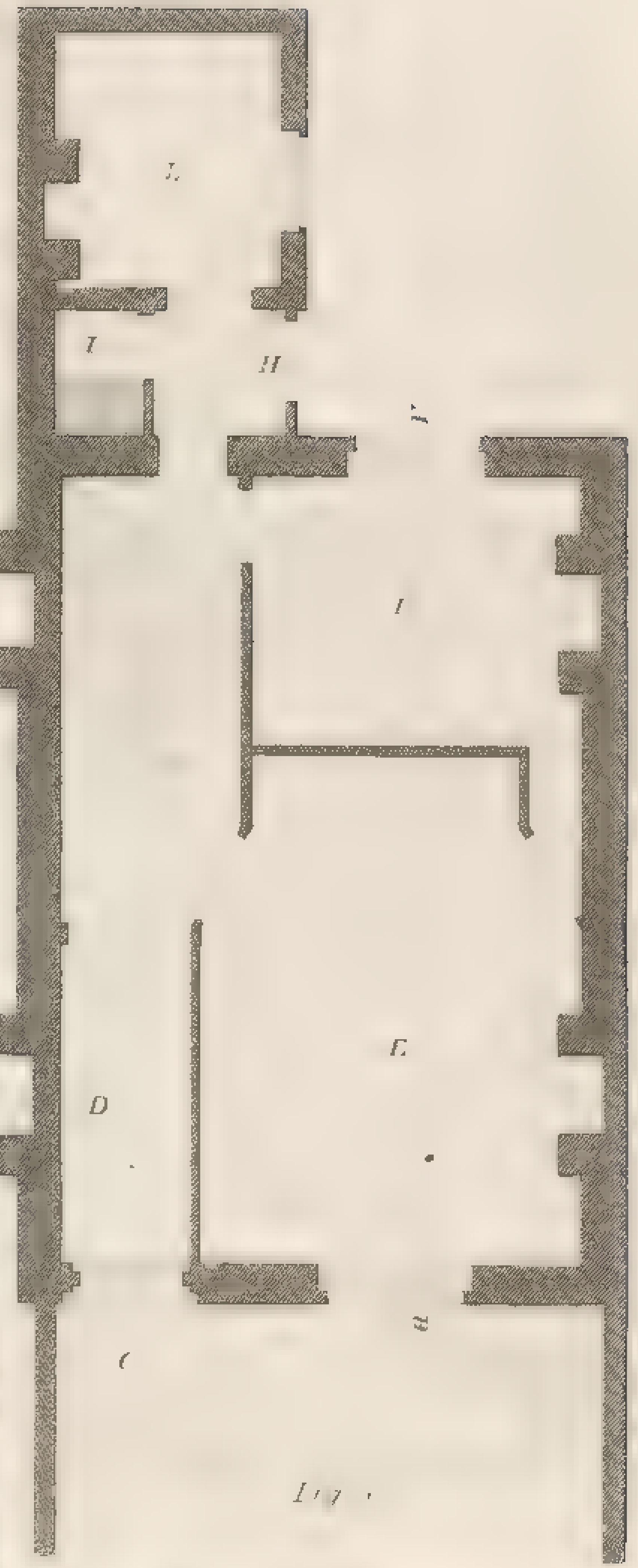
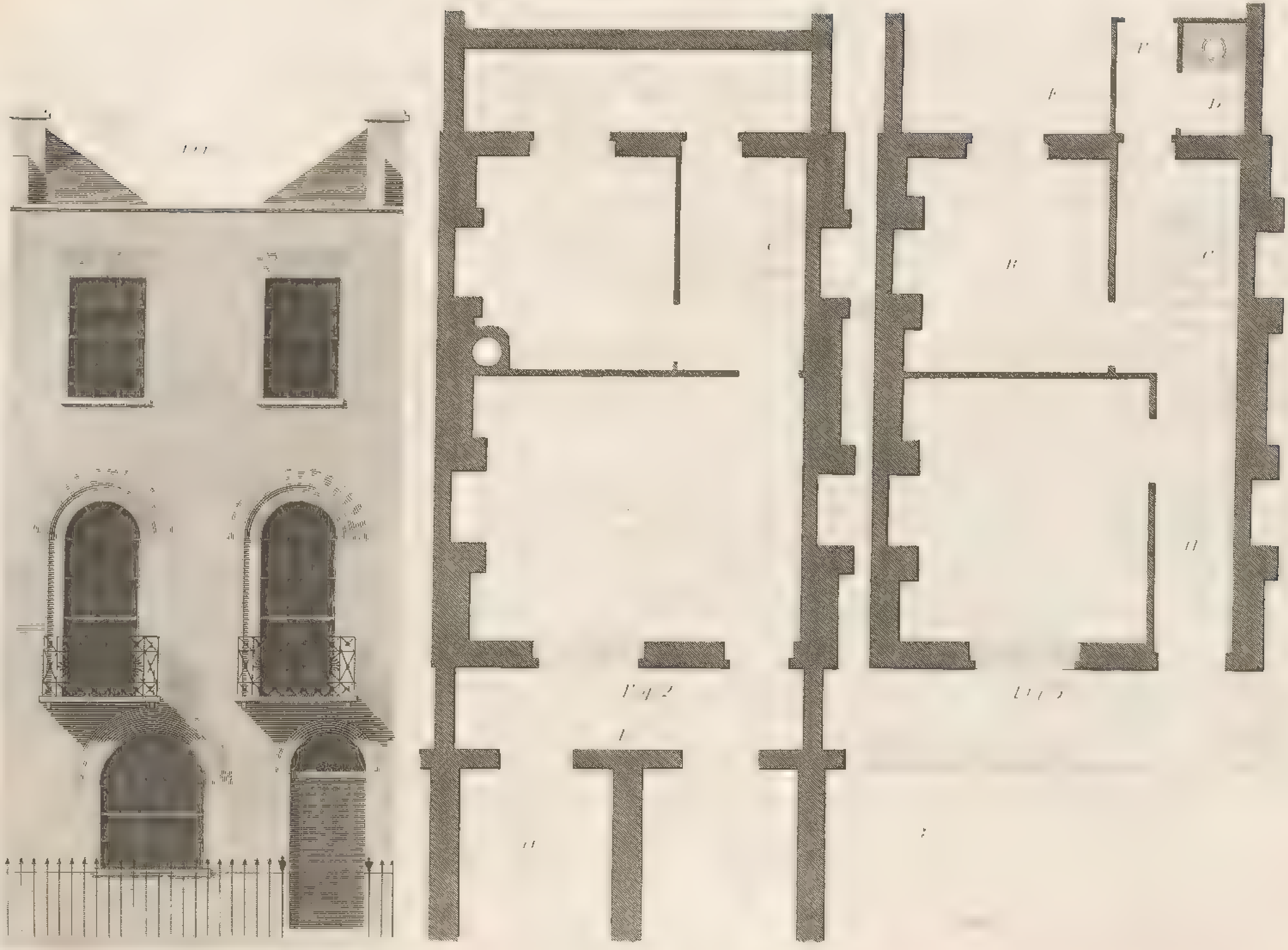


Fig. 3.

Drawn by M. A. Nicholson

Engraved by W. [illegible]

FOURTH RATE HOUSE.



Engraved by W. Symns

ELEVATION.

Fig 1.

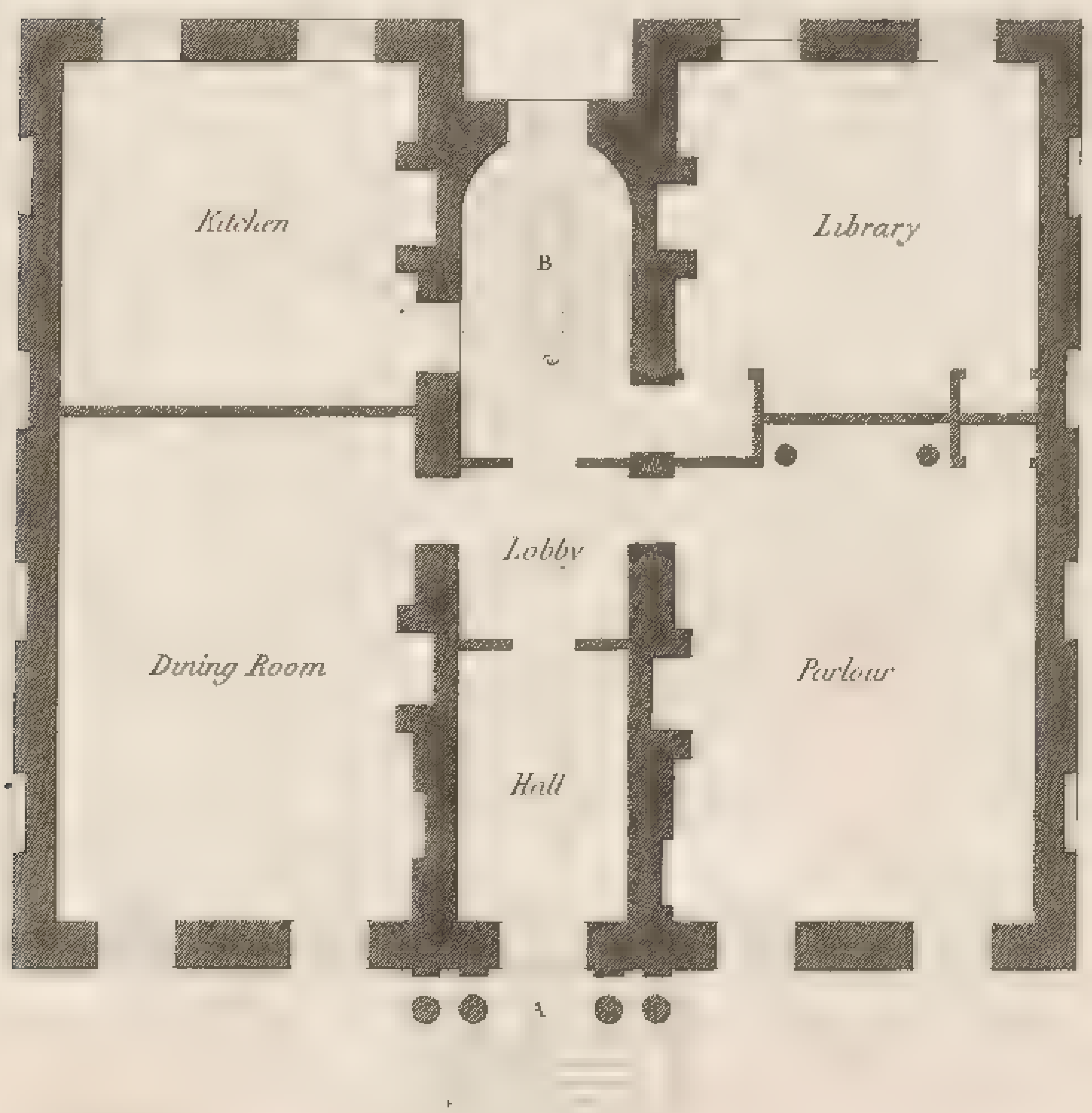


Fig 2.

GROUND PLAN.

Drawn by M.A. Nicholson.

Engraved by R. Roffe

London Published by Thos. Kelly 17 Paternoster Row June 1 1823

ARRANGEMENT AND DESCRIPTION OF THE PLATES GIVEN IN THIS WORK.

In turning over our numerous ENGRAVINGS, the reader will perceive that they consist of SEVERAL DISTINCT SERIES; of which the first is regularly numbered, from PLATE I. to XCII. Next follow the plates entitled ORDERS, Plate I. to XXV., and succeeding these are four plates of ORNAMENTS, &c.

In succession are thirteen plates to illustrate PERSPECTIVE, PROJECTION, SHADOWS, and INSTRUMENTS: to which follow a series of PLANS and ELEVATIONS, in forty-seven plates; including seven designs for SHOP-FRONTS, in three plates; four designs for WINDOWS, in two plates; and a beautiful design for a Grecian Chimney-Piece, on one plate.

The FIRST SERIES of plates [I. to XCII.] are regularly referred to in the Book, within the first 450 pages. The ORDERS, or Second Series, are treated on under the proper head, pages 451 to 517. PERSPECTIVE, PROJECTION, and SHADOWS, pages 518 to 550.

The plate of SCALES, *Geometry*, Pl. I., of the Second Edition, is described in pages 559, 560, and the plates of the CENTROLINEAD and CYCLOGRAPH in the succeeding pages.

The PLATES of ORNAMENTS, above mentioned, accompanying the plates of Orders, seem to require no particular description: yet it may be as well to notice that in Plate I, of Grecian Ornaments, *figure* 1 represents the ornament between the bead and small projecting band of the top of the column of the Temple of *Minerva Polias*, at Athens. *Figure* 2 is the ornament on the Cymatium of the door of the same temple, stretched out on a flat surface. *Figure* 3 is the enriched moulding of the cap of the same temple, showing the finishing of the external angle. *Figure* 4, *Egg and Tongue*, with beads below, belonging to the same cap.

The SERIES of PLANS and ELEVATIONS are as follow: PLATES I to V., *First, Second, Third*, and *Fourth, Rate Houses;* which require no other description than that already given in the work. PLATE VI. is the Plan and Elevation of a SMALL COUNTRY VILLA. *Figure* 1, Elevation of the villa, with a pediment in front, and another in the back. The construction of the roof, from its great projection of cornice, and the beautiful shadows which is thrown from the cantalivers has always a pleasing effect. The extent of this villa in front may be 48 feet 6 inches; in the centre is a porch, with four columns, of the Ionic order, coupled, on each side of the entrance, with a regular entablature and pediment. The height of the columns, 10 feet 6 inches; the entablature, 2 feet 6 inches; and the pediment, 2 feet 3 inches. The entrance is 3 feet 10 inches, raised 2 feet 10 inches above the level of the ground; ascended by six steps, one of which is in the door-way. The windows on each side of the porch are 5 feet from the ground, 7 feet 9 inches high, 3 feet 8 inches wide, with horizontal rustics on each side, from the top of the plinth to the floor of the bed-chamber, above which are two bands, one of which the architraves of the chamber-floor windows stop against. The windows of the chamber-floor are of the same height and width as the lower ones, with an architrave round them, on the top of which is a frieze and cornice.

Figure 2 is the *Ground Plan* of the above; A, the porch. Hall, 12 feet 4 inches by 7 feet 10 inches; lobby, 7 feet 9 inches square; B, stair-case; parlour, 20 feet 5 inches by 16 feet 6 inches; dining-room, 22 feet 10 inches by 16 feet 6 inches; library, 16 feet 6 inches by 14 feet; kitchen, 16 feet 3 inches by 15 feet 6 inches.

PLATE VII.—PLANS AND ELEVATIONS FOR A VILLA, WITH WINGS.—*Figure* 1. *Principal Elevation:* this building, if properly situated, would command a fine prospect from the circular bows in the wings. The whole extent of the building, including the wings, may be 85 feet 6 inches; each of the wings 24 feet 9 inches, and the body of the building 36 feet. The entrance is 3 feet 9 inches, raised upon three steps, of

* Directions to the Book-binder, for arranging and placing the plates, will be given hereafter.

6 inches rise, on the top of which are two Doric columns, with pilasters behind them. The columns are six diameters high; the entablature 2 feet 4 inches, and the blocking-course 1 foot. The windows on each side of the porch, in the centre part of the building, are 4 feet 3 inches from the ground, 7 feet 6 inches high, and 3 feet 8 inches wide, with a Grecian architrave around them; diminishing on each side of the centre of the window, and parallel to the sides of the column. The ears at the top of the window are vertical with the bottom of the architrave; the window in each wing, parallel to the front, is of the same dimensions as above: and the window in each bow is Venetian, placed between four columns of the Ionic order. The proportion of the columns is eight and a half diameters in height, and each diminishes about one-sixth; the entablature is one-fourth of the height of the column, on the top of which is a blocking-course, 10 inches high.

Figure 2.—Ground Plan of the Principal Story. A, the Vestibule, 13 feet 3 inches by 6 feet; BB, Passage, 33 feet by 4 feet; Parlour, 13 feet 3 inches by 12 feet 9 inches; Library, 13 feet 3 inches by 12 feet 9 inches; Dining-room, 18 feet, exclusive of the part in the bow, by 16 feet 6 inches; Drawing-room of the same dimensions; kitchen, 18 feet 8 inches by 12 feet 9 inches; D, Scullery, 6 feet 6 inches square: E, Pantry, 6 feet 2 inches by 3 feet 9 inches; C, Closet, 6 feet 4 inches by 5 feet 9 inches; *e*, Entrance to the Chambers; *f*, Entrance to the Wine-cellar, &c.

Figure 3.—Plan of the Chamber-Floor. AA, Passage to the Bed-rooms, 25 feet by 4 feet; B, Bed-room, 13 feet by 11 feet 10 inches; H, Water-closet, 6 feet 6 inches by 4 feet 2 inches; C, Bed-room, 13 feet 6 inches by 12 feet 10 inches; D, Dressing-room to ditto, 7 feet 5 inches by 4 feet; E, Front Bed-room, 13 feet 3 inches by 12 feet 9 inches; F, Dressing-room to ditto, 13 feet 3 inches by 6 feet; G, Bed-room.

Plate VIII.—Plan and Elevation of a Country Villa.—*Figure* 1. *Elevation of a Castellated Gothic Villa*, with buttresses, &c. This building would be suitable for a gentleman of moderate fortune. Its whole length is 78 feet; and its height, from the surface of the ground to the top of the battlements, 34 feet 2 inches. The battlements are continued all round the building, and the height of them is 2 feet 6 inches. The buttresses are 29 feet 3 inches high, with two water tables, on the top of which is a cornice. The cornice is continued all round the building. The windows on the ground-floor are 4 feet 3 inches from the ground, their height 9 feet, and width 4 feet. The top of each window is crowned with a tablet, which reaches to a little below the top of the window, on each side. The chamber-floor windows are 19 feet from the ground, their height is 8 feet, and width 4 feet, and they are crowned with a tablet, as below. The entrance is on the flank to the right, raised 1 foot 6 inches above the level of the ground, and ascended by three steps; it is enclosed within a porch, of 12 feet in front and 8 feet deep; the openings of the front and sides of the porch are 8 feet and 4 feet 10 inches. The height to the springing of the arches is 8 feet, and to the top of the arch 3 feet 10 inches, over which runs a band, and is of the same height as that in the octagonal front of the building. On the left flank is a green-house, which will have a very beautiful effect on entering, as seen at one extremity of the passage through a sash-door.

Figure 2.—Ground Plan of the Principal Story. A, *Porch*, 8 feet by 6 feet; B, *Passage*, communicating to the different apartments, 74 feet long by 6 feet wide; C, *Stone Staircase* to the Bed-chambers, steps 3 feet 6 inches long, treads 11 inches, risers rather more than 6 inches; *Breakfast-Room*, 20 feet by 17 feet 6 inches; *Dining-Room*, 20 feet by 17 feet 6 inches; *Drawing-Room*, 30 feet by 30 feet; *Library*, 20 feet by 17 feet 6 inches; E, *Parlour*, 20 feet by 17 feet 6 inches; D, *Waiting-Room*, or *Dressing-Room*, 19 feet by 15 feet; F, *Water-Closet*, which is entered by a door under the staircase; *Green-house*, 42 feet 6 inches by 12 feet 6 inches. The *Servants' apartments*, &c. are on the basement, which is entered by the staircase, C.

Plate IX.—Plan *and* Elevation *of a* Country Villa.—*Figure* 1. *Principal Elevation of a castellated Gothic Villa*, with Buttresses, and Pinnacles on a straight Front. The extent of this building, from the extremity of one wing to that of the other, is 60 feet: extent of each of the wings, 11 feet 10 inches. The body of the building, 36 feet 4 inches. The entrance, 3 feet 4 inches wide, with a Gothic head, receding

ELEVATION.

Fig 1

CHAMBER PLAN.

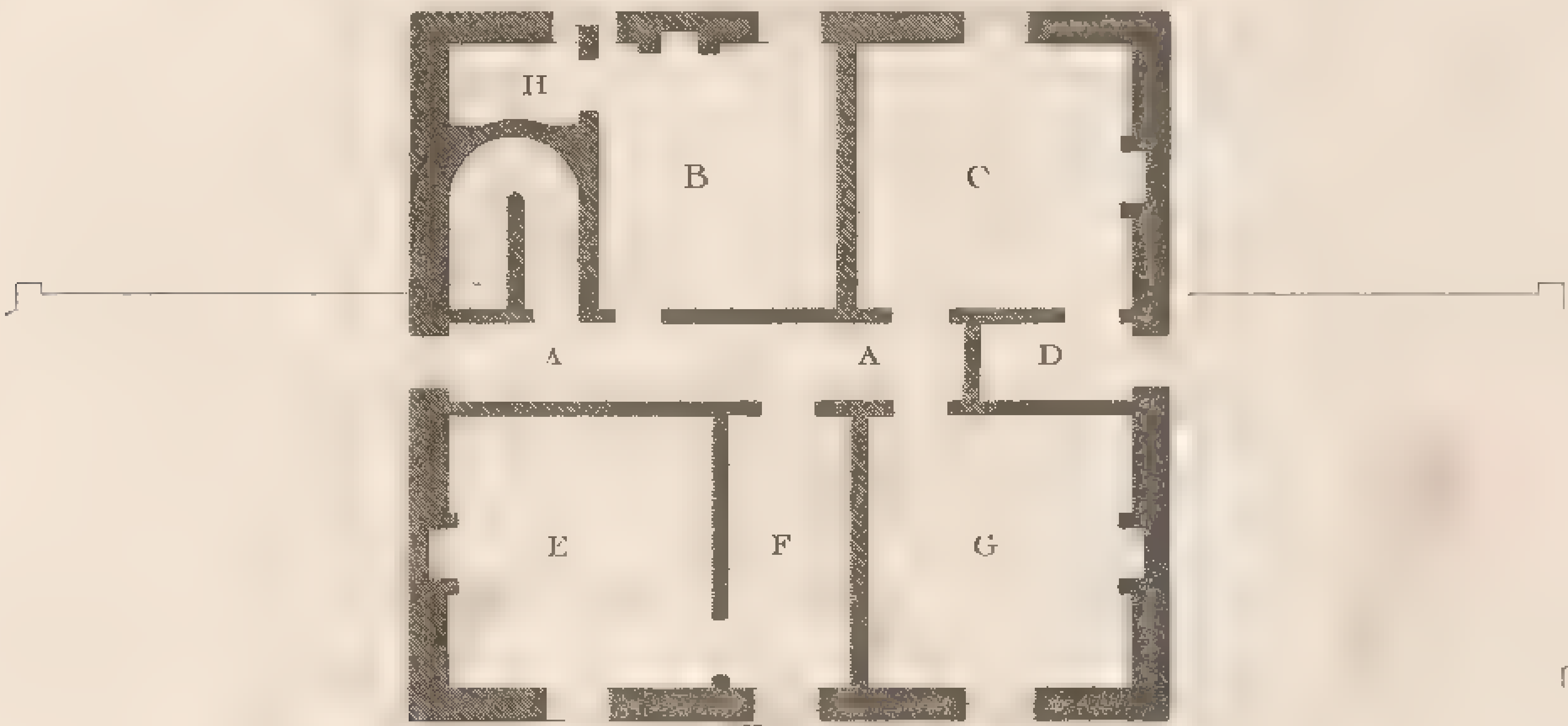


Fig. 3

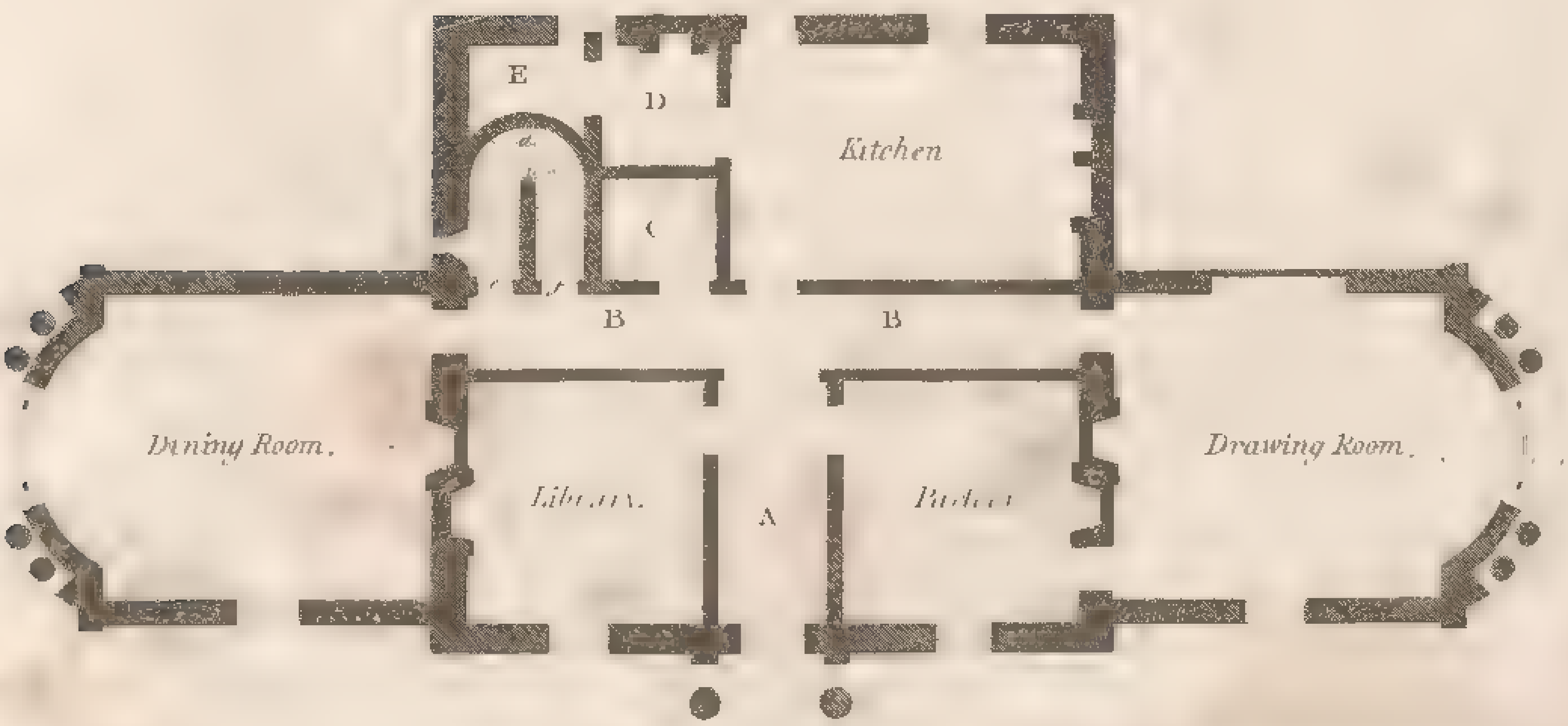


Fig. 2.

GROUND PLAN.

Designed by M.A.Nicholson

Engraved by W. Symns.

London, Published by Thos. Kelly, 17 Paternoster Row Augt. 9, 1823.

ELEVATION.

Fig. 1.

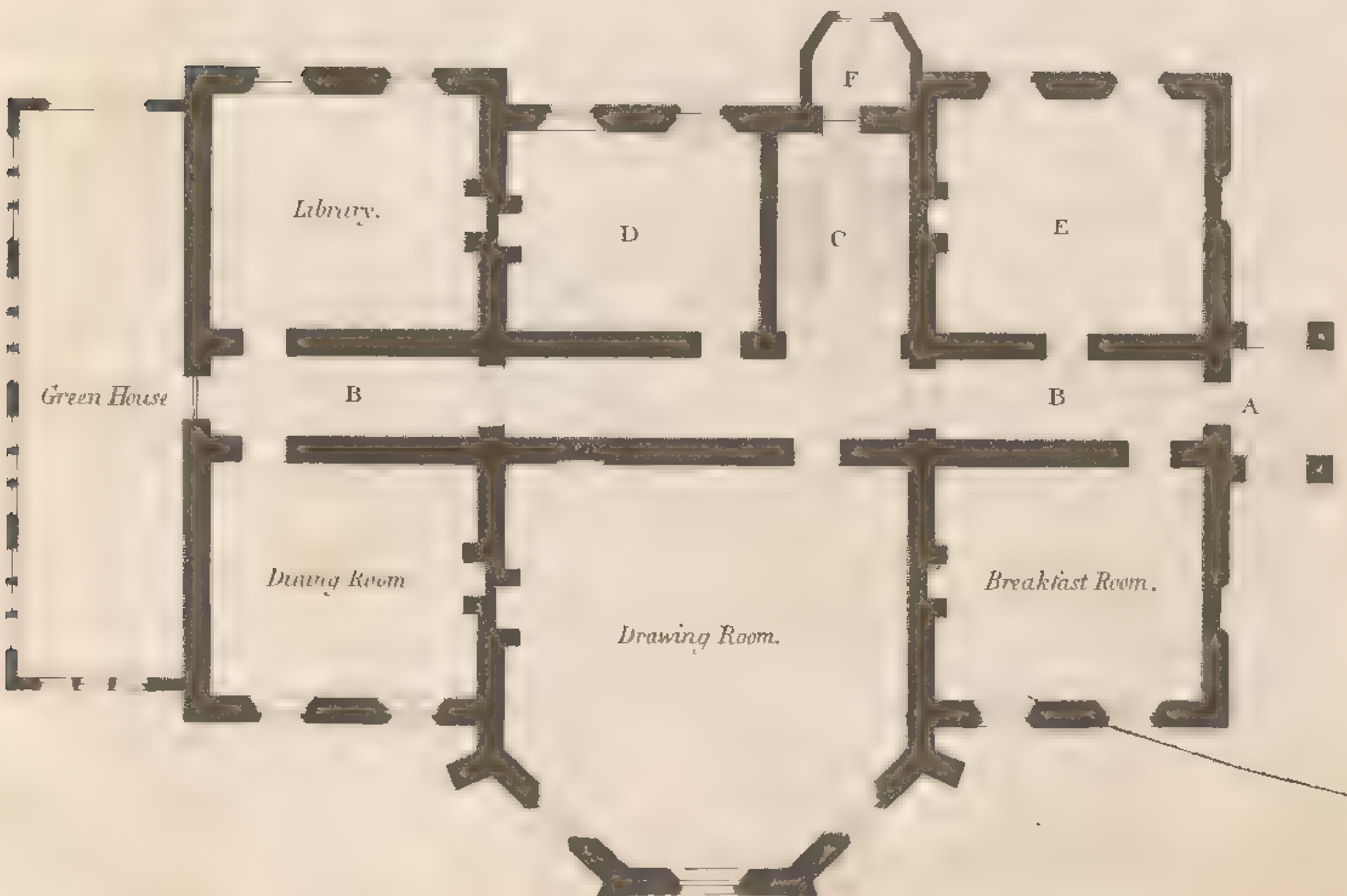


Fig. 2.

GROUND PLAN.

Designed by M.A. Nicholson

Engraved by J. Symns

by Thos. Kelly 17 Paternoster Row Jul

ELEVATION,

Fig 1

Scale of 10 5 0 10 20 30 Feet.

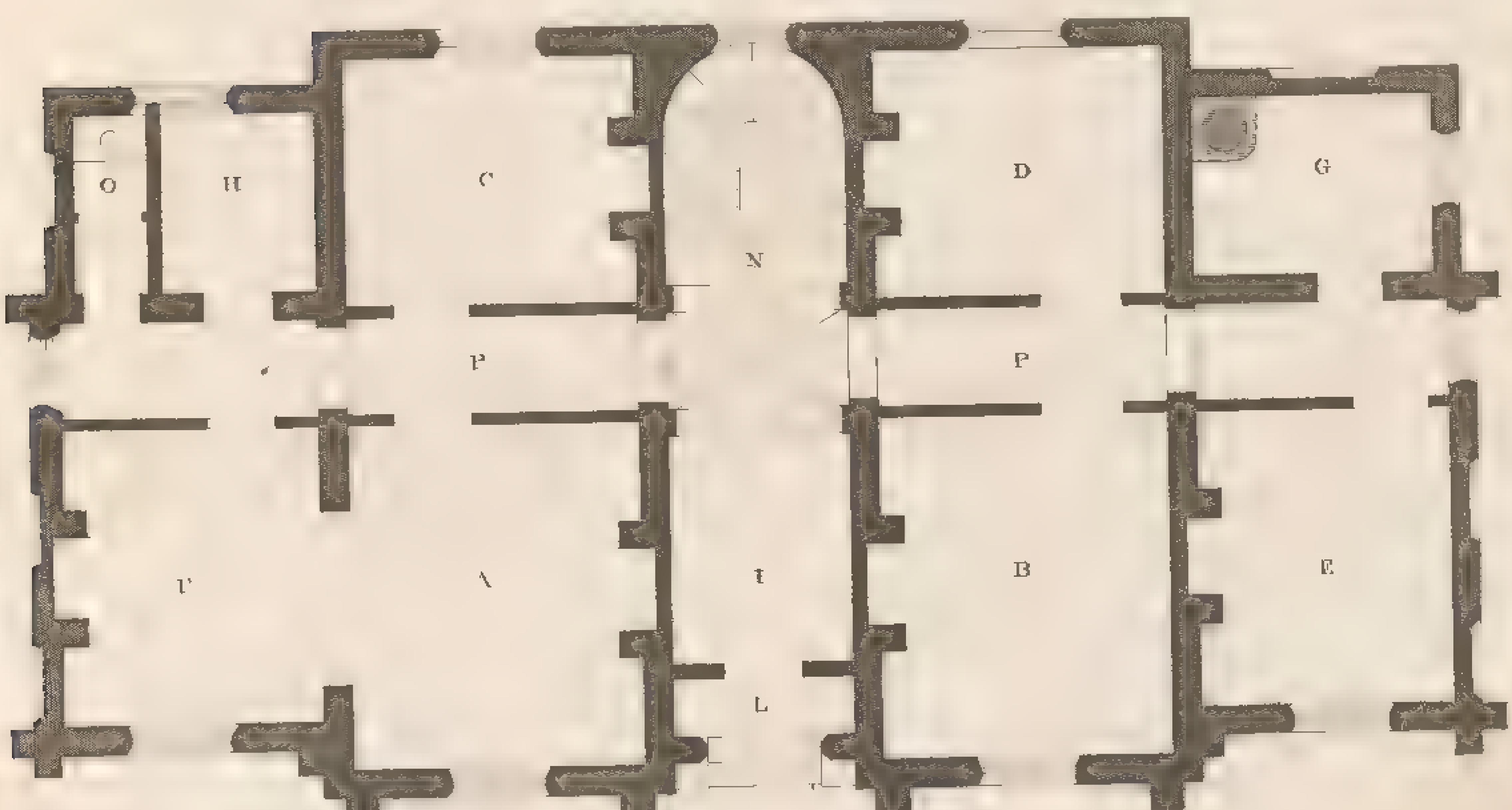


Fig 2

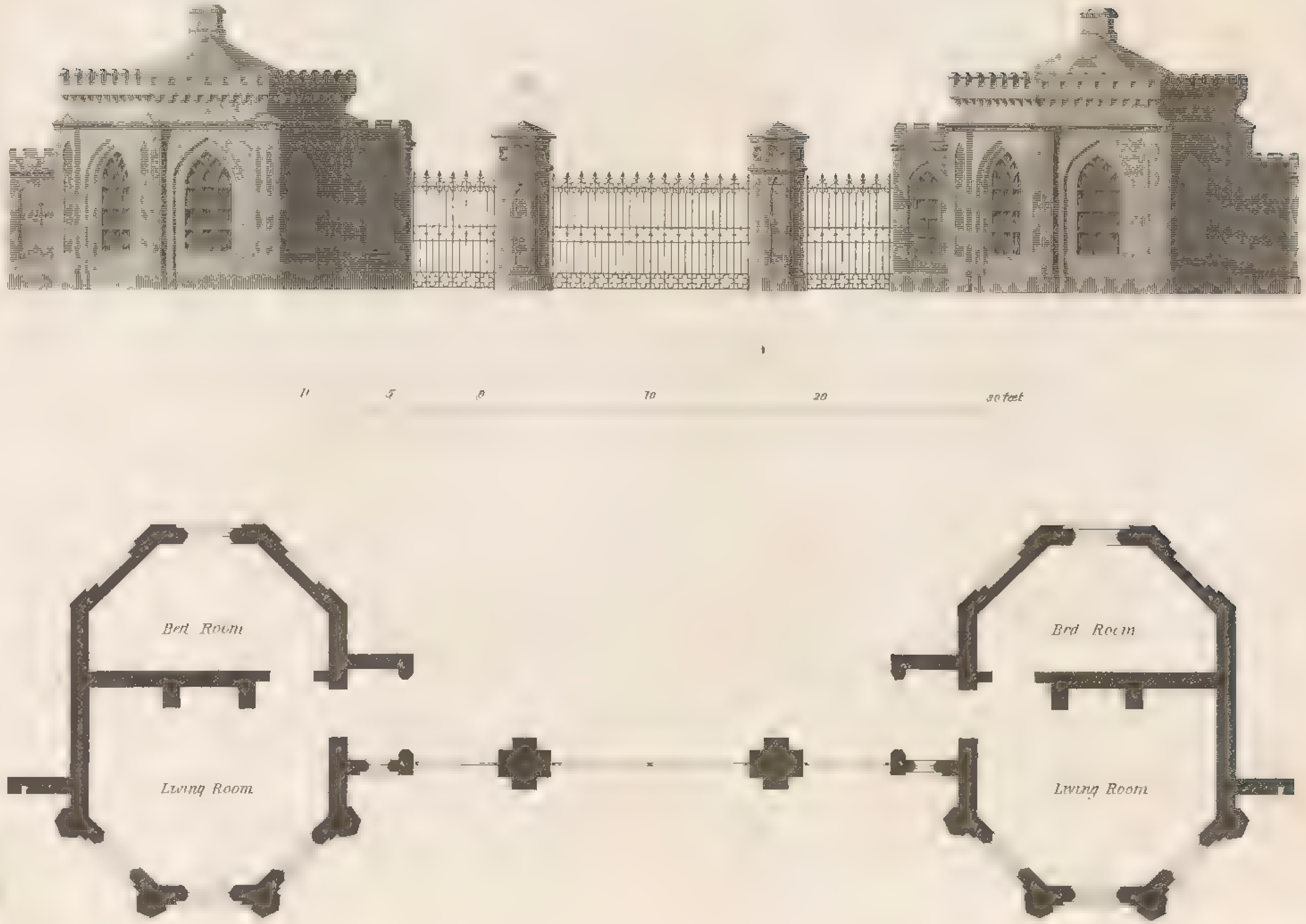
GROUND PLAN,

Engraved by R. Roffe

Designed by M. A. Nicholson.

London, Published by Thos Kelly, 17, Paternoster Row, August 1, 1823.

LODGE AND ENTRANCE TO A MANSION.

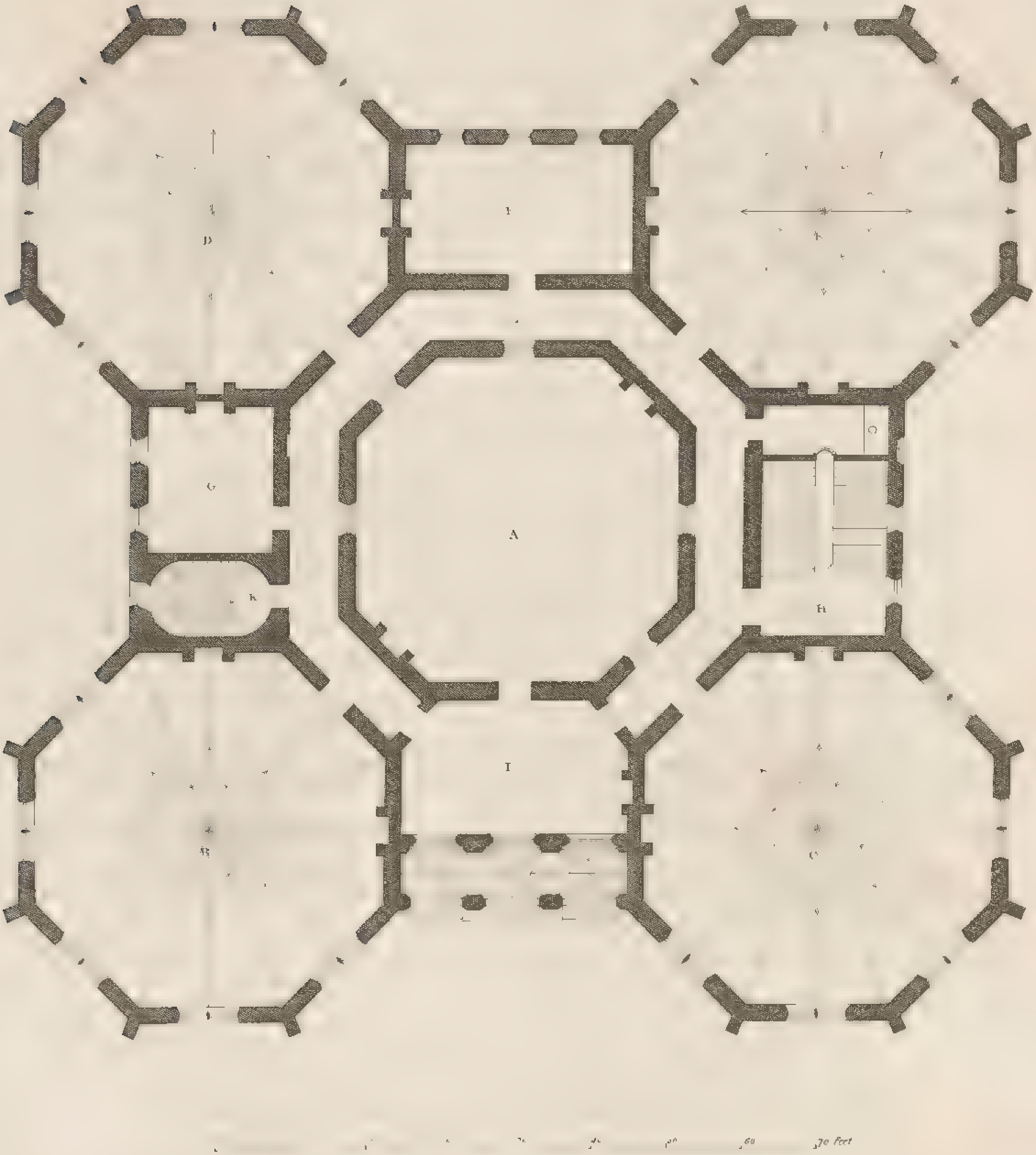


Designed by M.A. Nicholson

Engraved by H. Adlard

GROUND PLAN OF A DESIGN FOR A MANSION.

IN THE CASTELLATED STYLE



Designed by M. A. Nicholson

Engraved by R. Roffe

London, Published by Thos. Kelly 17 Paternoster Row June 1 1823

from the central part of the front 3 feet 6 inches, forming a Porch, and raised, above the level of the ground, 1 foot 6 inches; ascended by 3 steps of 6 inches rise. The entrance to the Porch is 4 feet 10 inches wide, and it rises 6 feet to the springing of the arch: the arch is 4 feet high, and is ornamented with mouldings and crockets on each side. The windows of the ground floor, on each side of the Porch, are 6 feet 6 inches high by 4 feet 6 inches wide; and those in the wings are 6 feet high, and 4 feet 6 inches wide: those in the bed chamber 4 feet 3 inches high and 4 feet wide.

Figure 2.—Ground Plan of the Principal Story.—A flight of three steps to the Porch, L, 7 feet 7 inches by 2 feet 6 inches. I. *Hall,* 9 feet 6 inches by 7 feet 7 inches. N, *Staircase,* of wood, steps 3 feet 3 inches, their rise is $6\frac{1}{2}$ inches, and the tread $10\frac{1}{2}$ inches. PP, *Passage* to the different apartments, 57 feet 8 inches by 4 feet. B, *Breakfast-Room,* 14 feet 3 inches by 12 feet. A, *Dining-Room,* with folding-doors, 14 feet 3 inches by 12 feet. F, 12 feet 3 inches by 10 feet 7 inches. D, *Parlour,* 12 feet by 10 feet 4 inches. C, *Library,* 12 feet by 10 feet 4 inches. H, *Servant's Waiting-Room,* 7 feet 6 inches by 6 feet 3 inches. E, *Kitchen,* 12 feet 3 inches by 10 feet 7 inches. G, *Wash-house,* 10 feet by 7 feet 6 inches. O, *Water-closet,* 4 feet 2 inches by 3 feet.

Plate X.—Lodges *and* Entrance *to a* Mansion.—These lodges are in the castellated style, and would be suitable for the octagonal mansion represented in *plate* XII.

Figure 1.—The Elevation of the Lodges.—The central part, betwixt the piers, for carriages, may be 11 feet 9 inches in the clear, above the plinth. The height of the gateway 7 feet; the piers 3 feet wide and 9 feet 10 inches high: the faces and sides forming the internal angles (see *plan, fig.* 2,) are ornamented with small recesses, terminating at the top with Gothic heads, filled in with three cusps and two semi-cusps, denominated by the name of a *Quadrefoil arch.* The part above that is carried solidly over the internal angles, forming a regular octagonal figure, with two water-table mouldings, and small panels in the faces betwixt the mouldings, filled in with cusps.

The *side-gate* for passengers is five feet wide above the plinth, betwixt the porch and pier. The elevations of the fronts of the lodges is of an octagonal form, with hexagonal buttresses on the angles, the sides of which are filled in with small recesses, with Gothic heads. The length of each lodge in front, including the porch, is 20 feet: its height, from the ground to the top of the battlements, 13 feet. The battlements, including the corbels, are 2 feet high: the windows are 3 feet wide and 6 feet high, from the sill to the top of the arch; standing in recesses 2 inches deep, 4 feet wide, and 8 feet high, from the top of the plinth to the top of the arch. The height, from the top of the roof to the ground, is 15 feet. The breadth of the battlements is 9 inches and a half. The embrasures, or openings, 5 inches wide.

Figure 2.—Plan of the Lodges and Gateways.—The whole length in front, from the extremity of one lodge to that of the other, is 67 feet 9 inches: the distances betwixt the porches is 27 feet 9 inches: the size of the porch, in the clear, is 5 feet 3 inches by 3 feet. The *Living-Rooms,* 14 feet by 11 feet 7 inches. The *Bed-Rooms* 11 feet 7 inches, by 7 feet 6 inches.

Plate XI.—Ground Plan *of a* Design *for a* Mansion *in the* Castellated Style.—The entrance is by a *Groined porch,* ascended by 4 steps; length of tread 7 feet, breadth 11 inches, and risers 6 inches, to be made of granite. I, *Hall,* 30 feet by 27 feet 6 inches. L, *Passage,* 6 feet 6 inches wide; lighted by a borrowed light from the lantern of the Picture Gallery. H, *Principal Staircase,* 23 feet long by 16 feet 6 inches; the length of the treads 7 feet, and breadth one foot; their rise, rather more than 6 inches. K, *Back Staircase,* 16 feet 4 inches by 10 feet; length of tread 4 feet 4 inches, breadth $10\frac{1}{2}$ inches; risers $6\frac{1}{2}$ inches. E, *Breakfast-Room,* 46 feet 6 inches by 46 feet 6 inches. F, *Music-Room,* 30 feet 6 inches by 17 feet. D, *Dining-Room,* 46 feet 6 inches by 46 feet 6 inches. G, *Parlour,* 19 feet by 17 feet. B, *Drawing-Room,* 46 feet 6 inches by 46 feet 6 inches. C, *Library,* of the same dimensions. A, *Picture-Gallery,* 43 feet by 43 feet, lighted by a lantern from the top of the building. The *Water-Closet,* 16 feet 8 inches by 6 feet 6 inches, lighted by a borrowed light through ground-glass, from the well-hole of the staircase.

The plans of the rooms above are adapted to contain, at least, seven Bed-Rooms, with Dressing-Rooms, and Closets.

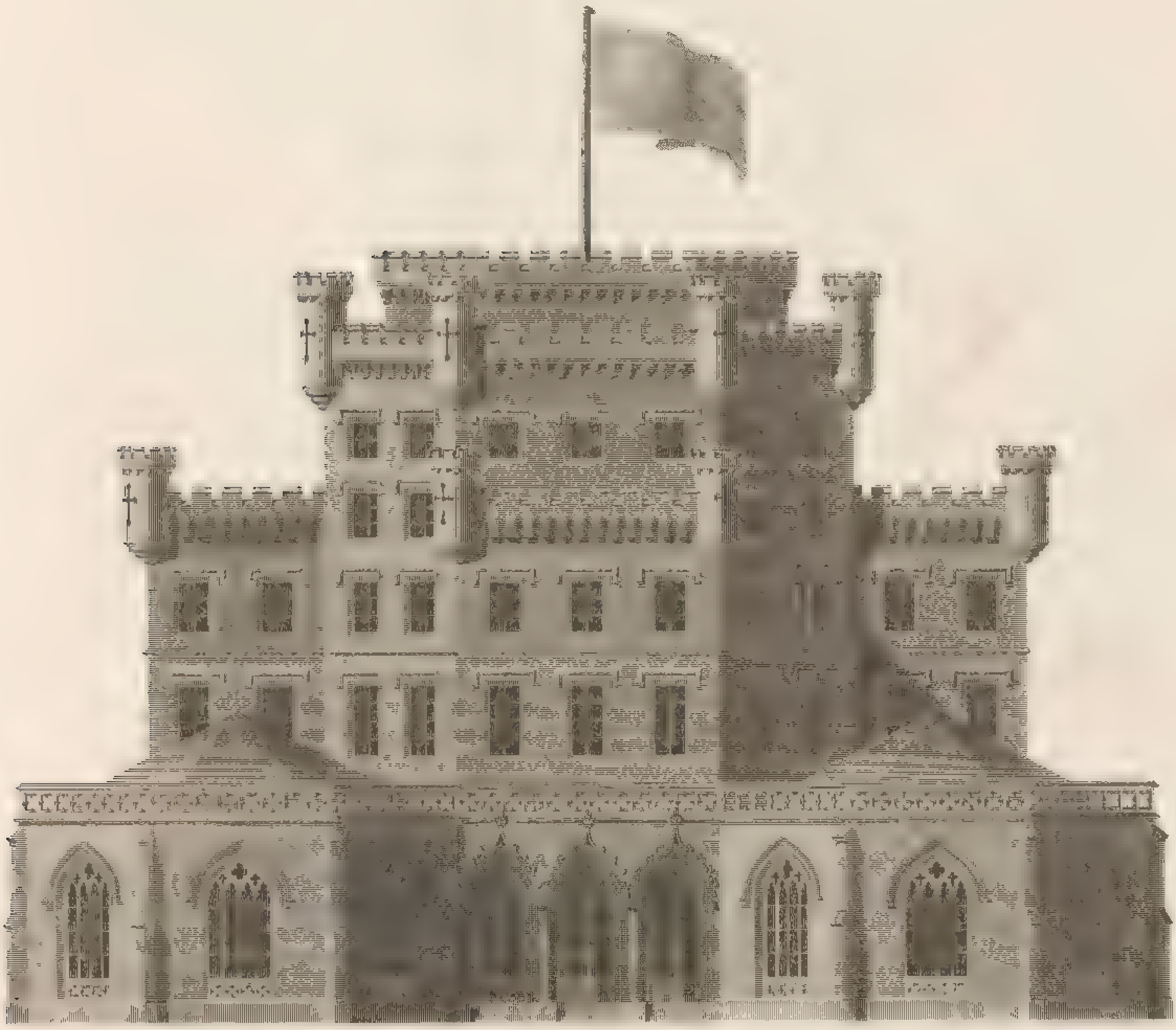
Plate XII.—Principal Elevation *for a* Mansion *in the* Castellated Style.—This building, from its construction, would have a majestic appearance if placed on a hill, or elevated ground, and entirely detached from other buildings, more especially if surrounded by wood, and near the side of some river or stream. The whole length in front may be assumed as 131 feet 6 inches, exclusive of the buttresses. The body of the building, parallel to the front, and at right angles, passing through the centre of it, will thus be 102 feet 6 inches. Its whole height, from the ground to the top of the battlements, 88 feet. The height to the top of the second row of battlements of the larger octagonal body, 79 feet 8 inches. The turrets, 15 feet 6 inches high, 5 feet 3 inches diameter, and projecting three quarters of a circle below the corbels, from the angles of the plain faces of the octagonal body. The windows in the faces, from the top downwards, are all of one width; each of their heights is, respectively, 5 feet, 6 feet, 7 feet, and 8 feet, high; with water-tables and mouldings over them. The window-frames, of oak, consist of a Munnion Transom and bars; the rectangular projections are 30 feet each in front, and 19 feet deep, with turrets at the angles 13 feet 6 inches high, and 5 feet diameter. The openings of the porch, in the clear, each 7 feet wide, and 17 feet high; ornamented on the chamfers with mouldings. On the top of the arch are crockets, rising in the form of pinnacles. The doors that light the Hall, which is seen through the openings of the porch, are each 5 feet 7 inches wide in the clear, and 16 feet high, moulded all round. The frames of the apertures are of oak, and are made to open in two halves; the bottom of which is panelled. The front of the octagonal wings extends 50 feet 3 inches; each of the faces is 20 feet 9 inches nearly, with buttresses on the angles. Their height, from the ground to the top of the enriched battlement, is 27 feet. The windows are each 7 feet 4 inches wide in the clear; their height, from the cill to the top of the arch, is 14 feet. The reveals are chamfered about half-way in. The space between the cill and the plinth is filled in with ornamented panels. The frames of the windows are of oak, with Gothic heads, and are made to open in one of the compartments.

Plate XIII.—Ground Plan *of the* Seat *of* Henry Monteith, *Esq. at Carstairs, near the River Clyde.*—The space H represents the *porch*, with buttresses at the corners, ascended by three steps, and groined in the inside. The dimensions are 16 feet by 15 feet 6 inches. E, *Hall*, with two small windows, on each side of the doorway; 19 feet 4 inches by 18 feet 4 inches. D, *Library*, of an octagonal form, 22 feet 9 inches by 22 feet 9 inches, to the inside of the bay-window. Length of the *Passage*, 10 feet 3 inches. I, *Grand Staircase*, 25 feet 3 inches by 23 feet 3 inches, lighted by a large window in the side wall, and opposite to the window in the bottom of the passage; length of the steps, 4 feet; rise 6 inches and a half; tread, 11 inches. C, *Breakfast-Room*, 32 feet 3 inches, including the bay, by 25 feet. B, *Dining-Room*, 39 feet by 30 feet, including the bay. A, *Drawing-Room*, 34 feet by 29 feet 6 inches, including the bay. F, *Bed-Room*, 22 feet 9 inches by 18 feet 5 inches. V, *Powdering-Room*, 11 feet 3 inches by 9 feet 9 inches. N, *Parlour*, 16 feet 6 inches by 11 feet 3 inches. L, *Nursery*, 23 feet 7 inches by 20 feet 5 inches. G, *Kitchen*, below the level of the rooms on the ground-floor, and communicating to them by a winding staircase at one corner, 23 feet 9 inches by 20 feet 6 inches. O, *Bed-Room*, 16 feet 9 inches by 14 feet. P, *Bed-Room*, 16 feet 9 inches by 10 feet. R, *Housekeeper's-Room*, 16 feet 5 inches by 15 feet. U, *Anti-room*, 11 feet 4 inches by 9 feet 4 inches, lighted at the top, with a closet at one end.

The largest winding staircase leads up to the servant's Bed-Rooms, which are carried lower than the Bed-Rooms over the body of the building, and communicate with the Bed-Rooms on the body of building by a door, leading off from the second flight of steps of the grand staircase. The parts which are broken off at the farthest extremity to the left, are the offices connected with the Kitchen.

Plate XIV.—Principal Elevation *of the* Seat *of* Henry Monteith, *Esq.*—The whole extent of this building, exclusive of the offices, not shown in the plate, is 175 feet. The principal part, including the bays, with the Oriel windows on each side of the porch, is 64 feet 10 inches. The entrance, within the porch, is 5 feet 9 inches wide in the clear, and 12 feet 10 inches high to the top of the soffit of the arch, raised 1 foot $7\frac{1}{2}$ in. above the level of the ground, and ascended by three steps of $6\frac{1}{2}$ in. rise, tread 1 foot. The width of the opening in the porch is 11 feet 6 inches, and its height 13 feet 6 inches, from the top of the steps to the top of the soffit of the arch.

DESIGN FOR A MANSION IN THE CASTELLATED STYLE.



Designed by M.A. Nicholson.

London, Published by Thos. Kelby, 17 Paternoster Row Sept. 20, 1823.

GROUND PLAN OF THE SEAT OF HENRY MONTEITH ESQ.[r]

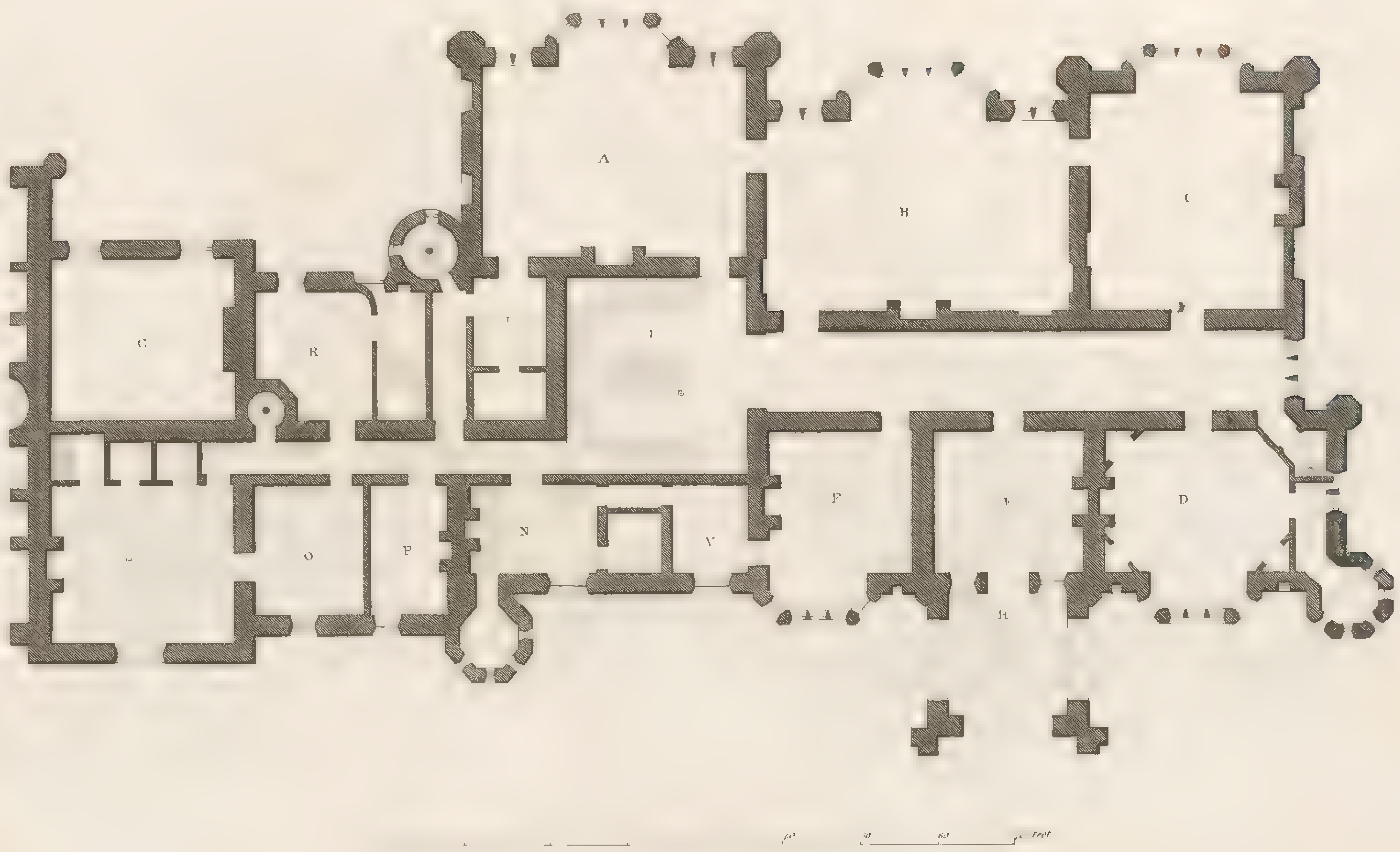


PLATE XIV.

PRINCIPAL ELEVATION OF THE SEAT OF HENRY MONTEITH ESQ

ERECTED AT CARSTAIRS, ADJACENT TO THE RIVER CLYDE.

London, Published by Thos Kelly, 17 Paternoster Row Sept. 4th 1824

ELEVATION.

Fig 1.

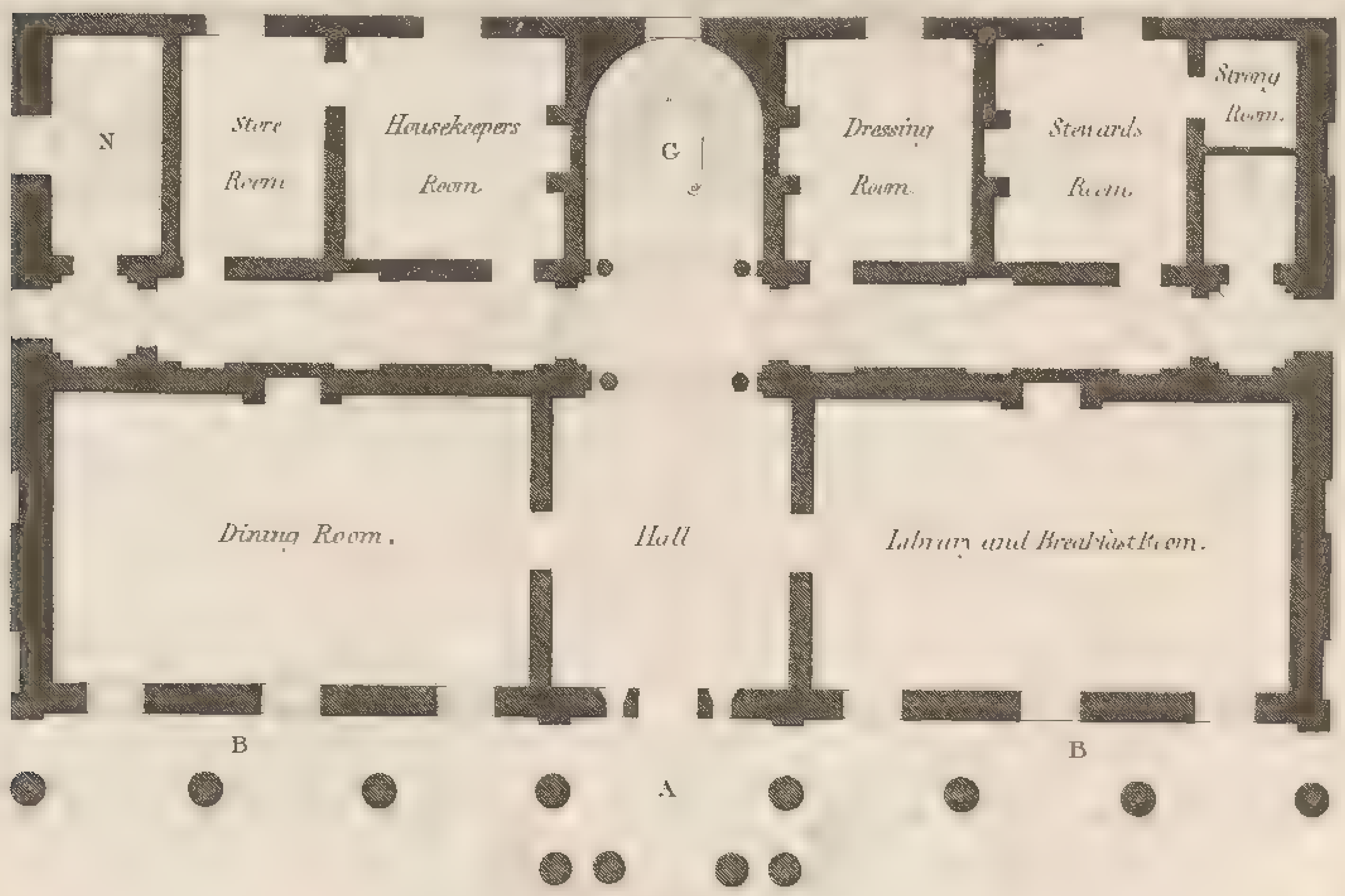


Fig 2

GROUND PLAN.

...ed by A. Nicholson.

London Published by Thos. Kelly Paternoster Row, July 5. 1823.

The height of the porch, from the ground to the top of the battlements, is 20 feet 9 inches. The height of the central part, behind the porch, from the ground to the top of the battlements, is 54 feet 6 inches; its breadth, (including the octagonal buttresses, which rise at the top into pinnacles,) is 24 feet. The height of the bay, with the Oriel window, between the octagonal buttresses, from the ground to the top of the battlements, is 37 feet; its breadth 12 feet 6 inches. The central Oriel window, without the munnions, is 5 feet wide, and 9 feet 6 inches high: each of the diagonal openings is 2 feet 6 inches wide, in the clear of the reveals.

The window above the bay is 5 feet 8 inches wide, and 6 feet 2 inches high, divided into munnions with Gothic heads. The bays, with the Oriel windows on each side of the porch, are 35 feet 6 inches high, from the ground to the top of the battlements, and 16 feet wide. Each of the Oriel windows, in the central part, on the ground-floor, is 7 feet 4 inches wide, and 12 feet high in the clear; and each of the diagonal openings 2 feet 4 inches in the clear. The Oriel windows over the ground-floor, in the central part, are each 7 feet 6 inches wide, and 9 feet high, and those on the diagonals 2 feet 4 inches wide. The part behind the bays is of a pediment-form, with square buttresses, and small pediments, rising into pinnacles.

The extreme wing, to the left, is 29 feet wide, and 39 feet high, from the ground to the top of the battlements. The turrets are each 11 feet 9 inches high, and project three-quarters of a circle out, from the angles below. The window on the ground-floor is 7 feet wide, and 9 feet 3 inches high. The Oriel window above, in the central opening, is 4 feet 9 inches wide and 7 feet high: the side openings are each 1 foot 7 inches wide. The space which recedes from the wing to the left, and to the octagonal tower, is 24 feet 5 inches wide, and 31 feet high to the top of the battlements.

The windows on the ground-floor are each 3 feet 9 inches wide, and 8 feet 5 inches high: the windows above are 3 feet 9 inches wide, and 5 feet 10 inches high. The octagonal tower, adjacent to the above, is 11 feet wide and 45 feet high; each of the small windows in the faces, from the top downwards, is 7 feet, 8 feet, and 8 feet 7 inches high: their width, in the clear, 1 foot.

The space between the Oriel windows and the octagonal tower is 29 feet wide, and 36 feet 6 inches high, from the ground to the top of the battlements; the windows on the ground-floor are 4 feet 10 inches wide, and 10 feet high; the windows above those on the ground-floor are 3 feet 9 inches wide, and 6 feet 6 inches high.

The octagonal tower at the extremity, to the right, is 11 feet wide, and 49 feet high from the ground to the top of the battlements; each of the windows, from the top downwards, is 6 feet 9 inches, 7 feet 9 inches, and 9 feet 9 inches, high; and each of their widths 13 inches. The small space between the tower and the Oriel windows is 5 feet 9 inches: the small windows between are blank. All the munnions and Gothic heads which divide the windows into compartments are of oak.

Plate XV.—Plan *and* Elevation *of a* Mansion.—*Figure* 1. This building, though perfectly straight in front, would have a pleasing effect from its colonnade, and the portico projecting out from it. The whole length of the building may be 89 feet 6 inches, and its height, from the ground to the top of the blocking-course, 49 feet. The columns are of the Doric order, without flutes, raised upon a plinth 18 inches above the level of the ground, and stand 4 feet from the wall. The height of the columns is 14 feet; being six diameters and a half high. The entablature, 2 feet 10 inches; above which is a blocking-course, about 10 inches high, on which the balcony is fixed.

The windows under the colonnade are 8 feet 9 inches high, and 4 feet 5 inches wide, and come down within $5\frac{1}{2}$ inches of the level of the colonnade, forming a step out. The architraves around the windows are one-sixth of their opening. The sashes are of the common kind; but are so constructed as to make them go higher up than the top of the window, in order that a person may get out without stooping.

The entrance is 4 feet 6 inches wide, with a small window on each side, and a fan-light over the top to lighten the vestibule. The two columns which stand before pilasters, and immediately behind the two extreme columns, in front of the portico, are intended to rest a beam upon the top of them, in order to support a viranda, which comes a little before the balcony, and is composed of piers of 1 foot 2 inches

square, and 9 feet 6 inches high; which may be either of stone or wood, with bases and ornamented caps. On the top of this is an entablature, 2 feet high, with a small blocking-course. The windows on each side of the viranda are 9 feet high, and 4 feet 3 inches broad, with an architrave one-sixth of the width round them, and a frieze and cornice above, and come down to 6 inches from the level of the balcony, forming a step out.

The sashes are of the same form as those below. Those in the attic are of smaller dimensions; their height 6 feet 3 inches by 4 feet. That in the centre is a Venetian window, with a flat segment-head. Above the attic is a cornice, 1 foot 3 inches high, and 2 feet projection; its parts are a fillet, ovolo, and corona, with a channel underneath it to carry off the rain. There is also a semi-reversa next to the wall, which is concealed in the channel, the bottom of which is on a level with the bottom of the corona, and cannot be seen unless in perspective. There is also a bead and fascia below that.

Figure 2.—Ground Plan, or *Principal Story.* A, *Porch.* BB, *Colonnade.* C, *Hall*, 19 feet 6 inches by 16 feet 2 inches. G, *Stone-Staircase*, with flyers and winders; the length of the steps is 4 feet 3 inches, their tread 11 inches, and their rise rather more than 6½ inches. N, *Back-Staircase.* The *Dining-Room*, 32 feet 6 inches by 19 feet 6 inches. *Library* and *Breakfast-Room* of the same dimensions. *Housekeeper's Room*, 15 feet square. *Steward's Room*, 15 feet by 13 feet. *Strong-Room*, 7 feet 3 inches by 6 feet 3 inches. *Dressing-Room*, 15 feet by 12 feet 9 inches. *Stone-Room*, 15 feet by 9 feet 10 inches.

Plate XVI.—Ground Plan *of a* Church *in the* Grecian Style. The Portico (*a*), of four columns, projects out from the front of the wall, 8 feet 6 inches. The *Vestibule* (*b*) leads to the body of the chapel and side stair-cases; diameter, 19 feet 9 inches within the columns. *Staircases* of an elliptical form (*cc*), leading to the gallery, 22 feet 8 inches by 20 feet 9 inches; length of treads, 4 feet 10 inches; breadth, in the middle, 11 inches; risers rather more than 6 inches. *Side Entrances*, *ff*.

The body of the church may be 89 feet long and 54 feet 3 inches broad, and it will contain sixteen hundred sittings, (including free seats,) exclusive of seats for children in front of the organ.

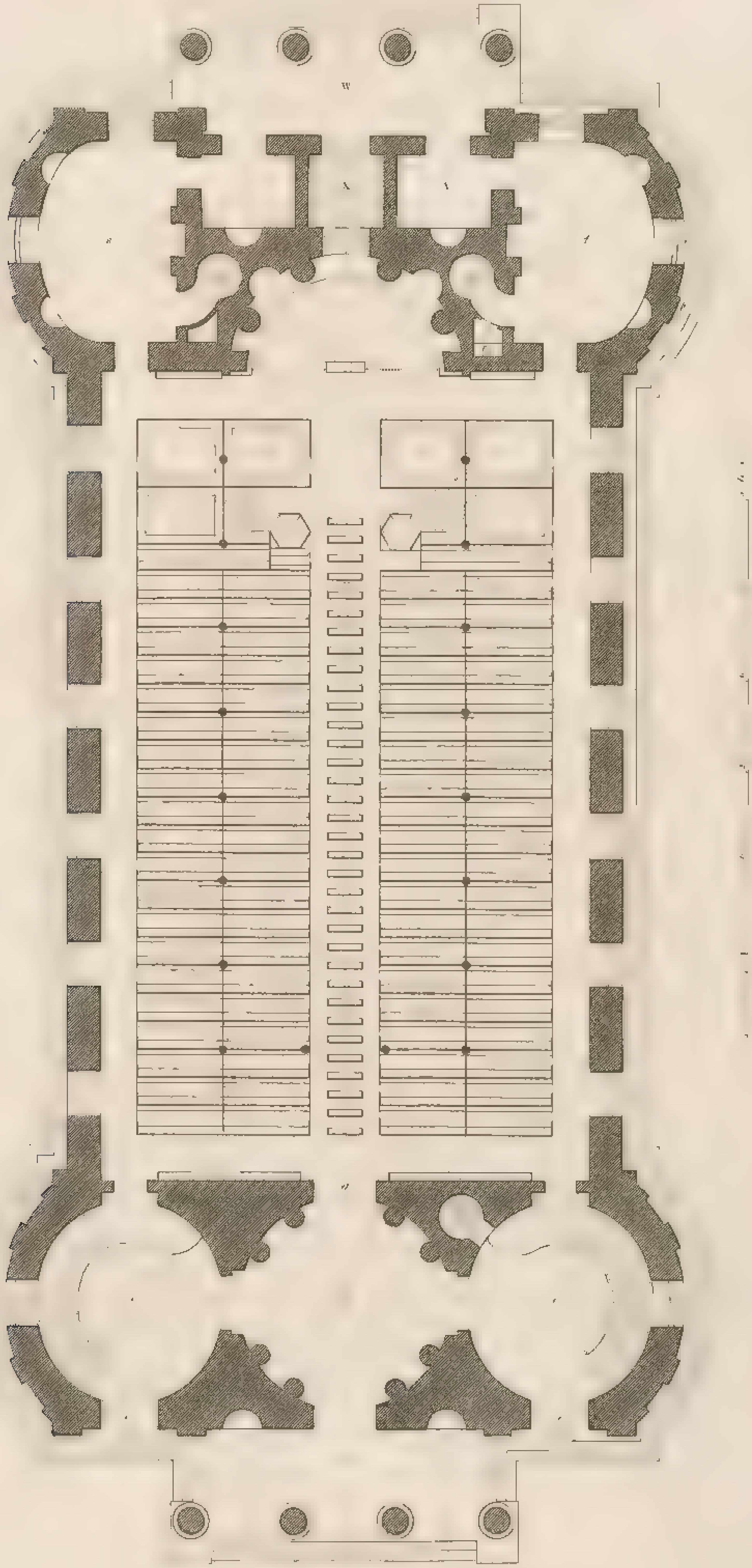
hhhh, represent *Pews*, 3 feet wide; seats, 1 foot; book-desk, 5½ inches; *oo*, *Larger Pews*; *pp*, spaces between the free-seats. The *Pulpit* (*n*), of an hexagonal form; *i*, *Stair* ascending to it. *Reading-desk* (*m*), with clerk's seat in front; stair (*i*) ascending to it. The *Communion-place*, of a circular form, with four three-quarter columns, and two antæ: betwixt the columns are two niches, and a window in the centre.

The *Vestry-Room* (*s*) is 22 feet 2 inches by 15 feet 4 inches. The Entrance to Circular Stair (*y*), leading to library above. The *Anti-Room* under Portico (*u*) 10 feet 5 inches by 8 feet. The *Robing-Room* (*t*), 22 feet 2 inches by 15 feet 4 inches. The Anti-Room (*v*) 10 feet 5 inches by 8 feet. X, *Entrance* to the *Catacombs.* W, *Back Portico*, of four columns, projecting out from the wall 5 feet 6 inches.

Plate XVII.—Front Elevation of the same Church, in the Grecian Style.—The extent of the front of this building to the extremities of the antæ is 64 feet 9 inches; the breadth of the portico, at the top of the columns, is 37 feet. The columns are raised 1 foot 7½ inches above the level of the ground, and are designed from the Monument of Lysicrates; (*See Orders, pl.* XXV.) their diameter is 3 feet, and height, including the base and capital, 29 feet. The height of the entablature is 7 feet 4 inches; the architrave, 2 feet 9 inches; the frieze, 1 foot 10 inches; and the cornice, 2 feet 9 inches. The ornament which stands on the top of the cornice is 13 inches high, and is continued all round the building. The antæ are of the same width as the upper diameter of the columns, and do not diminish. The capitals of the antæ are a composition, as there are no antæ to be found in this style of Grecian architecture. The principal entrance is ascended by three steps, in front of the portico, of 6½ in. rise; tread, 1 foot. Its width at the bottom is 6 feet 11 inches; it diminishes to the top, and its height is 14 feet. The side entrances are each 6 feet 7 inches at bottom, and diminish to the top; their height, 12 feet 9 inches, with an architrave round them and a cornice at the top, supported at each extremity by a console. The niches on each side of the principal entrance are 4 feet 3 inches wide, and 9 feet 10 inches high, and diminish on each side parallel to the sides of the columns.

The Attic, which stands over the cornice of the entablature, is 5 feet 9 inches high, with a dentil cornice and three fascias below. The height of the pediment is 7 feet 10 inches, from the top of the cornice on the attic.

GROUND PLAN, OF A CHURCH IN THE GRECIAN STYLE.



FRONT ELEVATION OF A CHURCH IN THE GRECIAN STYLE

Designed & Drawn by M.A.Nicholson.

Engraved by G. Gladwin

London, Published by Thos Kelly, 17 Paternoster Row, March 20.1824.

FLANK ELEVATION OF A CHURCH,
IN THE GRECIAN STYLE.

BACK ELEVATION OF A CHURCH IN THE GRECIAN STYLE.

Designed & Drawn by M. A. Nicholson

Engraved by G. Gladwin

London Published by Thos. Kelly 17 Paternoster Row April 24 1824

LONGITUDINAL SECTION OF A CHURCH

IN THE GRECIAN STYLE

The height of the pedestal, from the bottom of the pediment to the top of the columns round the belfry, is 7 feet 10 inches. The columns and entablature round the belfry are 20 feet 10 inches high, and are similar to those in the portico; the wall, which is seen between the columns, is rusticated above the two plinths. The apertures in the belfry, for letting out the sound, are 4 feet 2 inches wide, and 11 feet 3 inches high.

The part where the dials of the clock are placed is of an octagonal form; its height, including the two circular steps from the top of the cornice, round the entablature of the belfry, to the top of the cornice, above the dials, is 9 feet 10 inches. There are four dials in it, at right angles to each other, and four small apertures in the diagonal faces, each 3 feet wide and 4 feet high, filled in with perforated luffer boarding in the form of scales.

The part over the dials, above the two circular steps, is of an octagonal form, with eight columns supporting an entablature. Its height, including the two circular steps at the top of the entablature, is 15 feet 8 inches. The diameter of each column is 1 foot $5\frac{1}{4}$ in., and 11 feet 7 inches high; the entablature, 2 feet 7 inches. The height of the small pediments above the entablature is 1 foot 9 inches, with a honey-suckle betwixt each.

The height of the spire above the top of the pediments to the top of the cross is 44 feet $9\frac{1}{2}$ inches, and this portion is ornamented with scales to the height of 28 feet 10 inches. The whole height of the steeple, from the ground to the top of the cross, is 152 feet.

Plate XVIII.—Flank Elevation *of the same* Church, *in the* Grecian Style.—The whole extent of this front, including the projecting porticos on the bottom line of the entablature, is 166 feet 3 inches. That between the two extreme half antæ, on each side of the bows, is 146 feet 8 inches; and the plain part between the bows, is 88 feet 2 inches. Each of the bows is 26 feet 3 inches. The height, from the top of the steps to the top of the cills of the lower windows, is 3 feet 8 inches. The lower windows are 5 feet 2 inches wide, diminishing a little at the top, and their height is four feet 10 inches. The height between the under side of the lintel of the lower windows and the top of the cill of the upper windows is 6 feet 7 inches. The height of the windows above is 9 feet 6 inches; and the breadth, at the bottom, 5 feet, diminishing to the top about $3\frac{1}{2}$ inches. The height from the under side of the lintel of the upper windows, to the lower line of the entablature, is 4 feet 5 inches. The height from the ground to the top of the roof is 50 feet $7\frac{1}{2}$ inches. The frames of the windows to be of metal. All the ornaments on the exterior of this building may be of terra-cotta, or of stone, if built in a country where both labour and stone are cheap.

Plate XIX.—Back Elevation *of the same* Church, *in the* Grecian Style.—This view represents the entrance to the Catacombs, the Vestry-Room, and the Robing-Room. The columns, the width of the portico, and the spaces on each side of the portico, with the widths and heights, are the same as in the front elevation. The windows on each side of the portico are similar to those in the flank elevation, and are of the same height and breadth. The width of the entrance to the catacombs, in the clear, is 5 feet 8 inches at the bottom, diminishing upwards parallel to the sides of the columns; and its height is 10 feet 3 inches. The entrances on each side of the central one, are each 5 feet at the bottom and 10 feet 3 inches high. The doors are of oak, and open in two halves. The height of the projecting part, under the portico, is 15 feet 4 inches, from the top of the steps, to the top of the ornament which extends right and left. Over the central door are three urns, standing upon a small pedestal.

Plate XX.—Longitudinal Section *of the same* Church *in the* Grecian Style.—The lower part of this section represents the vaults, which are entered from the projecting part beneath the portico, at the east end, by a flight of steps descending downward. Their height from the ground to the top of the soffit of the arch is 7 feet 9 inches, and the width 6 feet.

The height of the ceiling underneath the gallery, from the level of the floor of the body of the church, is 10 feet 5 inches: the small columns, which stand upon pedestals, to the height of the pewing, and which support the gallery, are 6 feet 4 inches high, and their diameter about a ninth part of the height. The front of the gallery, over the columns, is 3 feet 5 inches high.

The height from the floor of the body of the church to the top of the ceiling, beneath the roof, is 36 feet 8 inches.

The columns in the communion-place are 21 feet 4 inches high, and their diameter 2 feet 4 inches. The shafts of the columns are represented in Scagliola: the entablature over the columns is 4 feet 11 inches high.

The height of the columns in the Vestibule is 20 feet 8 inches, and their diameter 2 feet 5 inches. The height of the entablature is 5 feet, and the dome 9 feet 4 inches, from the cornice to the elliptical opening which admits the light into the vestibule from the small windows above. The height from the level of the vestibule to the top of the first platform, which leads up to the belfry, is 43 feet 6 inches; to the second platform on the floor of the belfry, 57 feet; and, to the third platform, where the clock-work is fixed, 78 feet 9 inches. The view of the part above the clock-work exhibits the manner of framing the different off-sets to the top of the spire.

Plate XXI.—Transverse Section *of the same* Church, *in the* Grecian Style.—This section exhibits a view on looking towards the west end. The lower part shows the arrangement of the vaults, with the passages communicating to them. The depth of the vaults, on each side of the central passage, is 10 feet; and of those on the right and left of the side passages, 9 feet. The width of the side passages is 3 feet 3 inches, and of the middle one 5 feet 9 inches. The openings in the exterior walls, which are sectioned, are of a circular form, and are to admit the light into the vaults, by means of circular walls built in front of them, and covered with a grating.

Over the vaults is shown a section of the interior of the pews, the free seats down the middle aisle, and also the middle and side entrances to the body of the church. Upon the gallery is shown the Organ, and the side entrances from the staircases.

The breadth of the gallery, which is shown in this section, is 14 feet 10 inches from the wall, to the front of the gallery. The width of the passage is 3 feet 4 inches, and each of the pews 2 feet 8 inches. The height of the seats in the pewing, is 1 foot 6 inches.

Plate XXII.—Ground Plan *of a* Chapel.—A, represents the *Porch*, recessed within two columns, 26 feet 4 inches by 4 feet 6 inches. B, an elliptical *Vestibule*, with pilasters and niches, lighted from the top, 27 feet 3 inches by 16 feet 10 inches. D and C, *Side Staircases* to gallery, 25 feet by 13 feet; with a circular staircase in one corner, leading to the children's gallery and tower.

The size of the interior of the body of the chapel is 83 feet by 58 feet. The principal passage, representing the free seats, is 8 feet within the clear of the pew-doors. The side passages are each 3 feet to the front of the seats next the walls. The pews are 3 feet wide; the seats 1 foot; the book-desk $5\frac{1}{2}$ inches; and the doors 1 foot 7 inches.

The *Pulpit, (n)* is of an hexagonal form, with stairs ascending up to it. *o, Reading-Desk,* with clerk's seat in front.

The little black circles represent the columns which support the gallery. The *Communion-Place (H)* is of an elliptical form, and raised one foot high. E, *Vestry-Room,* 18 feet 6 inches by 13 feet, with a fire-place, and small closets in the angles. The *Strong Closet, (e)* 6 feet 2 inches by 5 feet 2 inches. *Water-Closet, (g)* 6 feet by 3 feet 9 inches, the mean proportion. F, *Robing-Room,* with fire-place, and closets of the same dimensions as Vestry-Room. G, entrance to the vaults.

Plate XXIII.—Principal Elevation *of the same* Chapel.—This building is in the style of the *Grecian Doric.* The extent of its front, to the extremities of the pilasters, is 66 feet. Its height, from the ground to the top of the cross, is 112 feet. The entrance, or door, is raised 2 feet 8 inches above the level of the ground, ascended by 5 steps of rather more than 6 inches rise, which are continued all round the building. The opening of the door is 7 feet 3 inches in the clear at bottom, and 6 feet 10 inches at the top; diminishing about one-seventeenth part of the breadth. The door is of oak; it is divided into eight panels, and opens in two halves, to the height of the bead betwixt the third and fourth panel; and is hinged to a vertical bead, which runs up by the side of the architrave of the door. The architrave is about two-ninths of the breadth

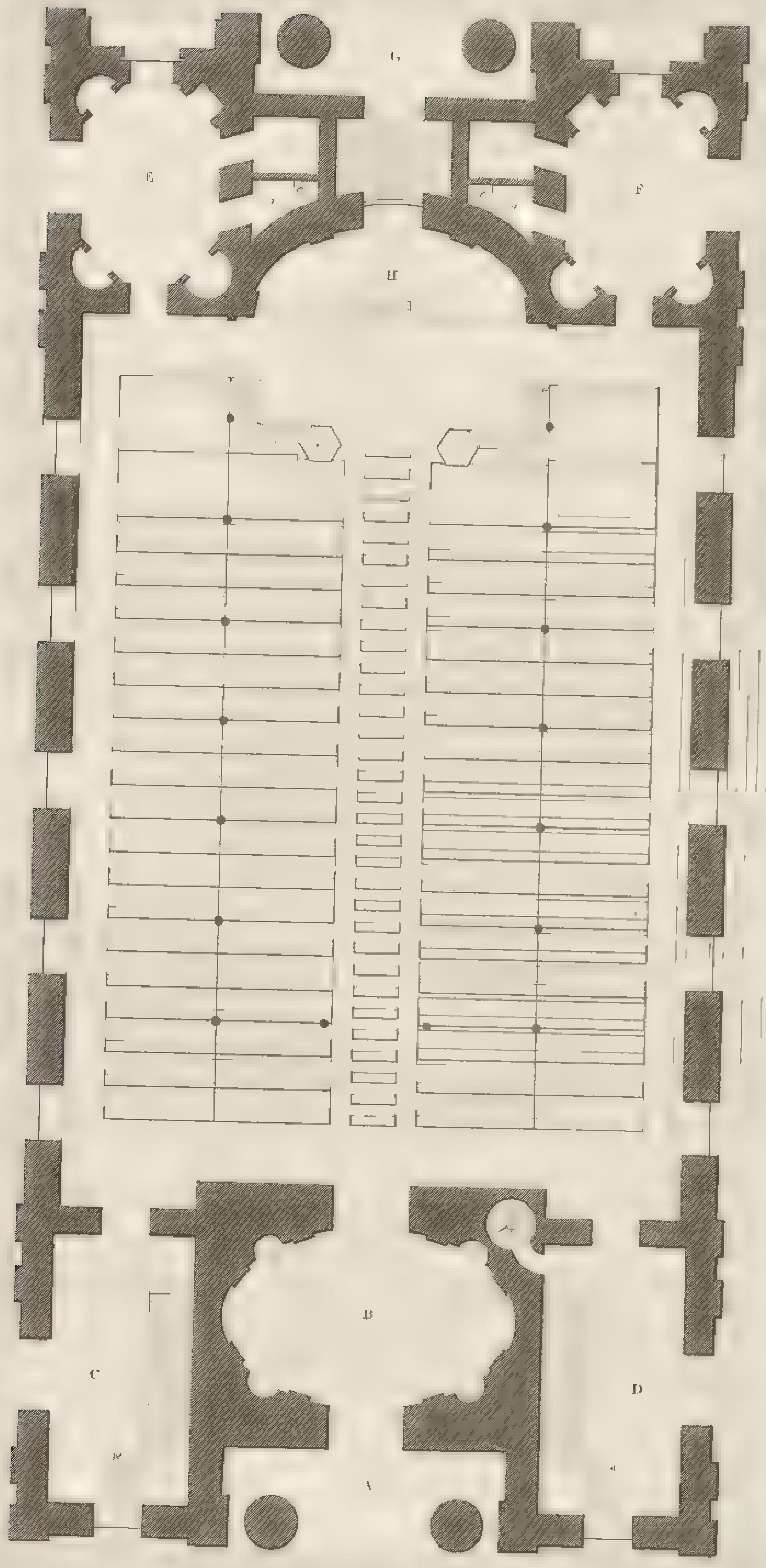
TRANSVERSE SECTION

Engraved by Edw.d Kenna

London Published by Thos Kelly 17 Paternoster Row, Octr 23 1824

PLATE XXII.

GROUND PLAN
OF A CHAPEL.



Designed by M. A. Nicholson.

...raved by ... Dick

London, Published by Thos. Kelly, 77 Paternoster Row Nov. 15 1833

PRINCIPAL ELEVATION OF A CHAPEL.

London, Published by Thos. Kelly, 17 Paternoster Row, March 13, 1824.

FLANK ELEVATION OF A CHAPEL

PLATE XXIV A

BACK ELEVATION OF A CHAPEL

Designed & Drawn by M.A. Nicholson | *Engraved by Edw. K.*

London, Published by Thos. Kelly 17 Paternoster Row, July 31, 1824

of the door. That part of the architrave which extends across the top of the door, is a little less. Over the architrave is a Cornice and Pediment, with an ornament at each corner, supported at each extremity of the cornice by a console. Over the door is a panel, which may be filled in with bas-relief, or an inscription.

The Columns are 31 feet 5 inches high; their diameter at bottom 5 feet $2\frac{1}{2}$ inches, and at top 4 feet. The pilasters are of the same width as the top of the column. The mouldings of the caps are similar to those of the Monument of Thrasyllus. The lower windows betwixt the pilasters, are 5 feet 5 inches wide at bottom, and at top 5 feet $1\frac{1}{4}$ in. The windows above are of the same width at bottom as those below, and at top 5 feet $3\frac{1}{2}$ in. The architraves are 1 foot $1\frac{1}{2}$ in. with a break at top, of about 2 inches. The bars of the windows are of metal. The cills of the windows are $11\frac{1}{2}$ inches.

The height of the Architrave, Frieze, and Cornice, is 8 feet. The breadth of the triglyphs is 2 feet 5 inches. The height of the Pediment, from the top of the cornice to the top of the Cymatium, is 11 feet 6 inches: on the top, and at each extremity of which are placed *Acroteriæ*.

That part which projects beyond the bottom of the Cupola, is to admit light into the vestibule by means of six small windows in the faces of the pedestal of the Cupola, which is concealed within it. The windows in the belfry are 4 feet 5 inches wide, and 11 feet 6 inches high, to the top of the arch. The aperture of the latter is filled in with horizontal luffer-boarding. The pilasters round the belfry are 16 feet 6 inches high, and 1 foot 11 inches wide; the moulding in the caps, are the same as those in the front; the bars are similar to the attic base; the height of the entablature is 4 feet 2 inches, with wreaths in the frieze, and ornaments above the cornice.

The part above the belfry, which contains the clock-work, is of an octagonal form, with a cornice and continued ornament above, similar to that on the top of the cornice of the Monument of Lysicrates. (*Orders, Plate* XXV.) The faces of the octagonal part is filled in with four dials, at right angles to each other, and four small windows, 3 feet 6 inches wide, and 3 feet high: the apertures of which are filled in with luffer-boarding, in the form of scales. Above the octagonal part is a circular dome raised upon a step, with a ball and cross over it.

Plate XXIV.—Flank Elevation *of the same* Chapel.—The whole length of this elevation is 142 feet between the two outer pilasters. That part between the pilasters, wherein the windows are, is 79 feet. The heights of the doors, pilasters, entablature, and cupola, are the same as those in the front elevation. The lower windows are 5 feet 4 inches wide and 4 feet 7 inches high, and diminish at the top one inch and a half: the windows above these are 5 feet 4 inches wide, and 9 feet 8 inches high, and diminish 3 inches and three quarters at top. The architraves are 1 foot 1 inch and a half, with a break at top of about 2 inches on each side: over the top of the architrave is a cornice and a pediment, with a honeysuckle at each extremity.

Plate XXIV. *A.*—The Back Elevation *of the same* Chapel.—The general dimensions of this elevation, in the heights and breadths, are the same as in the principal elevation, and differ only in the recesses, with the piers and arches turned over them between the antæ; and the entrance to the catacombs, with the recessed window within the arch, for lighting the Communion-place.

The entrance between the columns is 5 feet 8 inches wide, and 9 feet 4 inches high, with folding-doors, and circular holes in them for ventilation. The height, from the top of the steps, round the building, to the top of the cornice over the entrance, is 12 feet 5 inches. The piers of the outer arch, behind the columns, are in the same face with the wall below the cornice over the door: the opening of the outer arch is 12 feet 8 inches wide, and 17 feet 8 inches high, to the soffit of the arch, the inner arch is recessed about 5 inches from the outer one, and forms a margin of 10 inches all round. Over the entrance is a sarcophagus standing on a plinth.

The height of the piers, with the imposts and bases, which support the archivolts between the antæ, is 21 feet 2 inches, the opening between the piers is 10 feet 9 inches, and the height, from the top of the steps to the top of the intrados, is 26 feet 6 inches. Over the centre of each window is a wreath.

Plate XXV.—Longitudinal Section *of the same* Chapel.—This section is taken through the middle of the chapel from west to east. The lower part represents the brick vaults, which are entered beneath the

porch, from the east end, by a flight of steps descending downwards. The height of the vaults is 8 feet from the ground to the top of the soffit of the arch; the breadth 6 feet 6 inches, and the depth, 11 feet 6 inches. The thickness of the arches is a brick and a half. Above the arches is represented the dwarf wall, down the middle passage, (see transverse section, *pl.* XXVI,) for resting the Yorkshire slabs on, which cover the vacancy where the flues are laid for heating the chapel.

The part which supports the Reading-Desk is of an octagonal form, standing upon a small plinth, with eight insulated columns and entablature, similar to the *Tower of the Winds;* the height of the columns is 5 feet; their diameter, an eighth part of their height; and the entablature a sixth part. Over the middle entrance, against the side of the Tower, is shown the side of the organ, raised upon a platform.

The height of the pilasters in the Communion-Place, is 22 feet 6 inches, their breadth one-ninth part of the height, with plain caps and bases. The height of the entablature is 5 feet 6 inches. The general heights of the interior of the body of the chapel, are given in the description of the transverse section.

The height of the Vestibule, from the ground to the top of the elliptical opening in the dome, which admits the light from the small windows beneath the first platform of the tower, is 30 feet 6 inches; the height of the pilasters is 18 feet, and of the entablature 4 feet 10 inches. Over the top of the cornice is a dome, whose transverse section is a semi-circle, and longitudinal section an ellipsis, with sunk panels, radiating towards the apex. The height, from the level of the vestibule to the flooring boards of the first platform in the tower, is 46 feet; the height, from the floor of the first platform to the floor of the belfry, is 15 feet; from the floor of the belfry to the third platform, 19 feet; from the third platform to the fourth platform, 11 feet; and, from the fourth platform to the top of the soffit of the dome, 7 feet 4 inches. The dome is tied together by means of iron bars, radiating from a vertical spindle in the middle of it, and the ends of which are let into the stones and run in with lead.

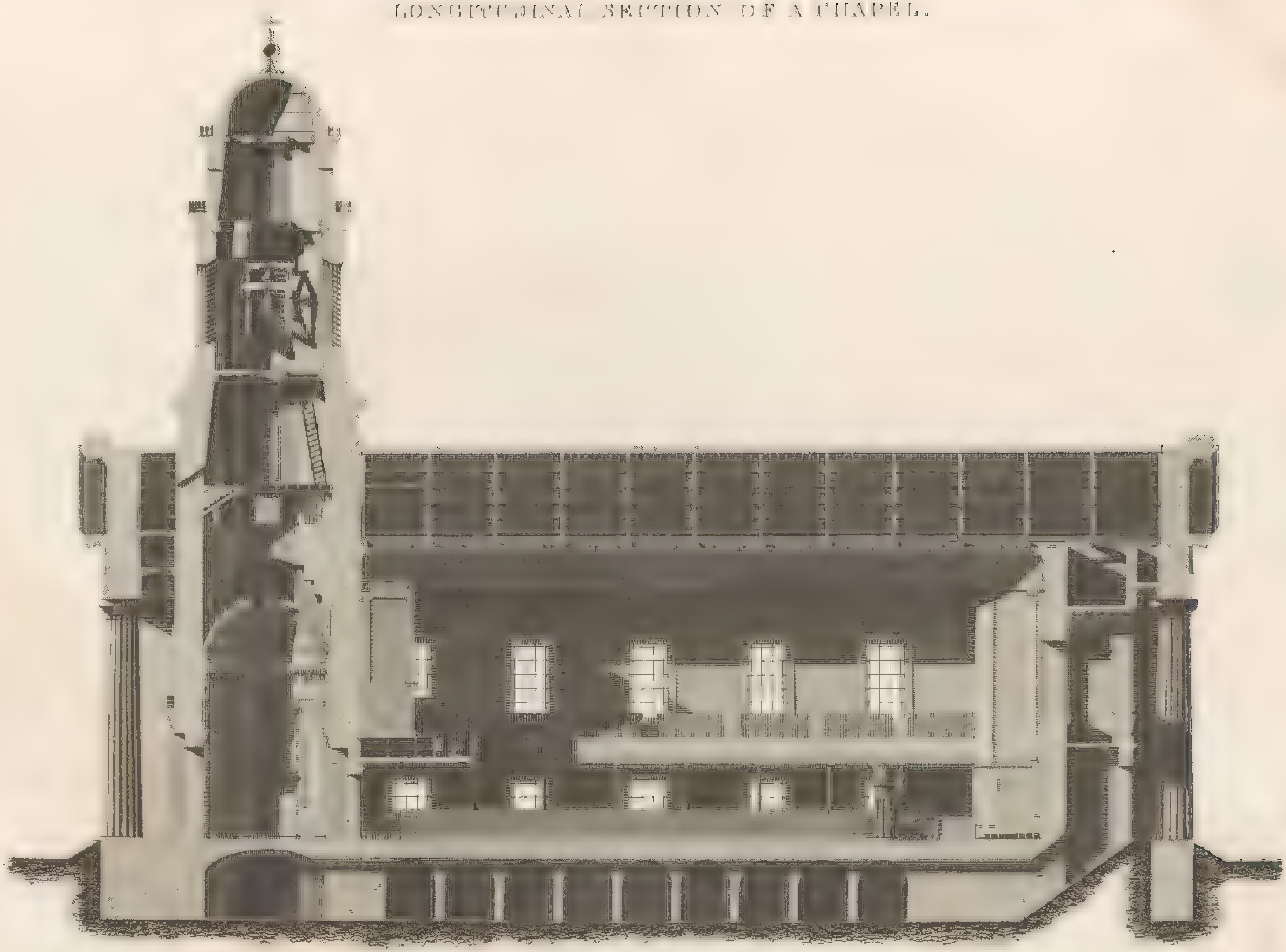
Plate XXVI.—Transverse Section *of the same* Chapel. This section represents the interior of the chapel, on looking towards the west-end, and shows the organ with the children's seats in front of it; also the doors on the gallery, entering from the staircases. The side pews, passages, and truss to the gallery. The lower part, under the gallery, exhibits the principal entrance from the vestibule, the side entrances from the staircases, with a section of the interior of the pews, raised upon sleepers 5 inches above the level of the passages.

The height of the gallery, above the level of the passages, is 10 feet. The height of the columns, which support it, is 6 feet 3 inches, and their diameter rather more than $9\frac{1}{2}$ inches: they are raised upon pedestals to the height of the top of the pewing, are of the Grecian Doric, and may be either plain or fluted. The height of the front of the gallery is 3 feet $7\frac{1}{2}$ inches; and the height, from the ceiling beneath the gallery to the ceiling of the roof, is 27 feet 9 inches.

Plate XXVII.—Plan *of an* Octagonal Mausoleum. *A*, the *Porch*, with two columns and pilasters in front, raised two feet above the level of the ground, ascended by 4 steps of 6 inches rise. The intercolumniation of the columns is of the *Diastyle*, with pilasters facing the flank of each column. The Entrance (*f*) is 4 feet 8 inches wide. *B*, Chapel, 19 feet diameter, from the front of the base of one column to the front of the opposite; with eight columns, of the Doric order, and pilasters behind them. The intercolumniation of the columns is of the *Systyle*. *c, c, c, c, c*, are cells for the coffins, to be 6 feet 8 inches deep, and 2 feet 3 inches wide, with dwarf walls, 9 inches thick, carried up on each side, and arches turned over them; (See the *Section.*) *e, e, e, e*, represent porticos, with four columns, each projecting out from the body of the building 3 feet 9 inches; the intercolumniation of these columns are of the *Pycnostyle*. *a, a, a*, denote pedestals for figures to stand on.

Plate XXVIII.—Principal Elevation *of the* Octagonal Mausoleum. This structure is in the Greek style, and would be suitable for a family mausoleum, placed in a retired situation on a nobleman's estate, especially if surrounded by water. The diameter of the body of the building, parallel to the front, is 49 feet 4 inches; its height 43 feet 7 inches. The columns are designed from those of the *Tower of the Winds*. Those forming the porticos stand upon a plinth, 2 feet high. The height of the columns is

LONGITUDINAL SECTION OF A CHAPEL.



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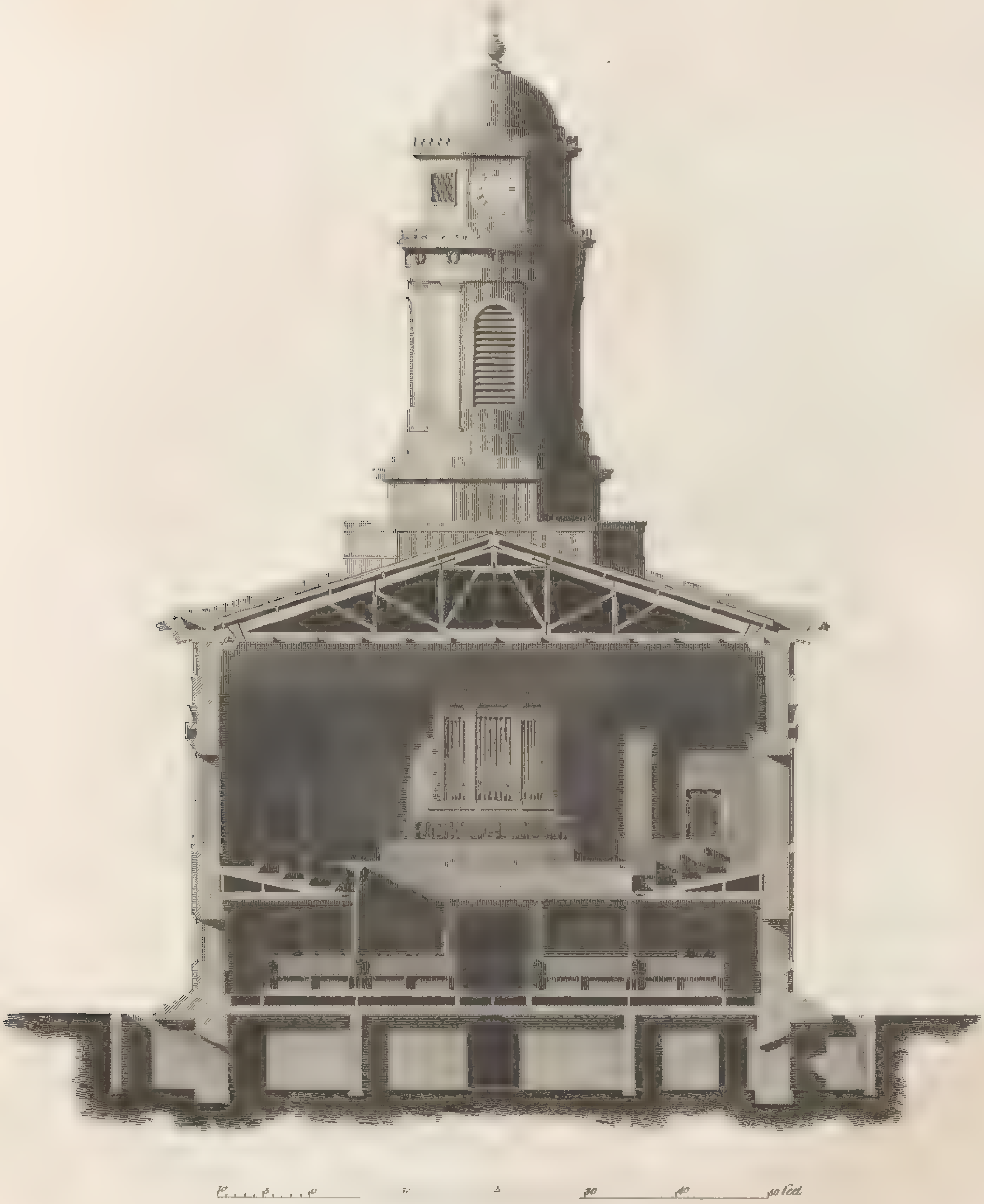
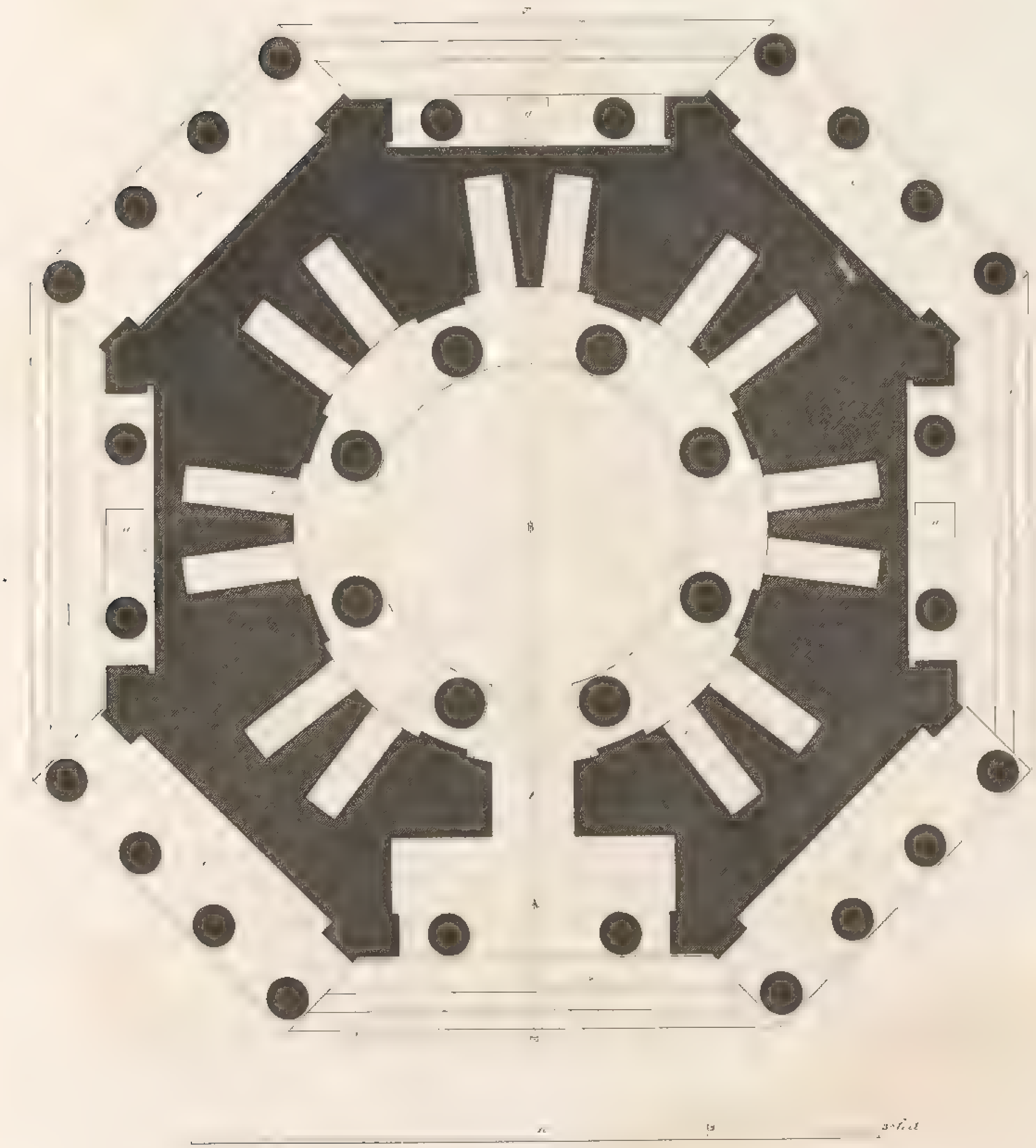


Designed & Drawn by M. A. Nicholson.

London, Published by Thos. Kelly, 17 Paternoster Row Augst. 7th 1824.

PLAN OF A MAUSOLEUM.



Designed by M.A. Nicholson.

London, Published by Thos. Kelly 17 Paternoster Row, May 25th 1824.

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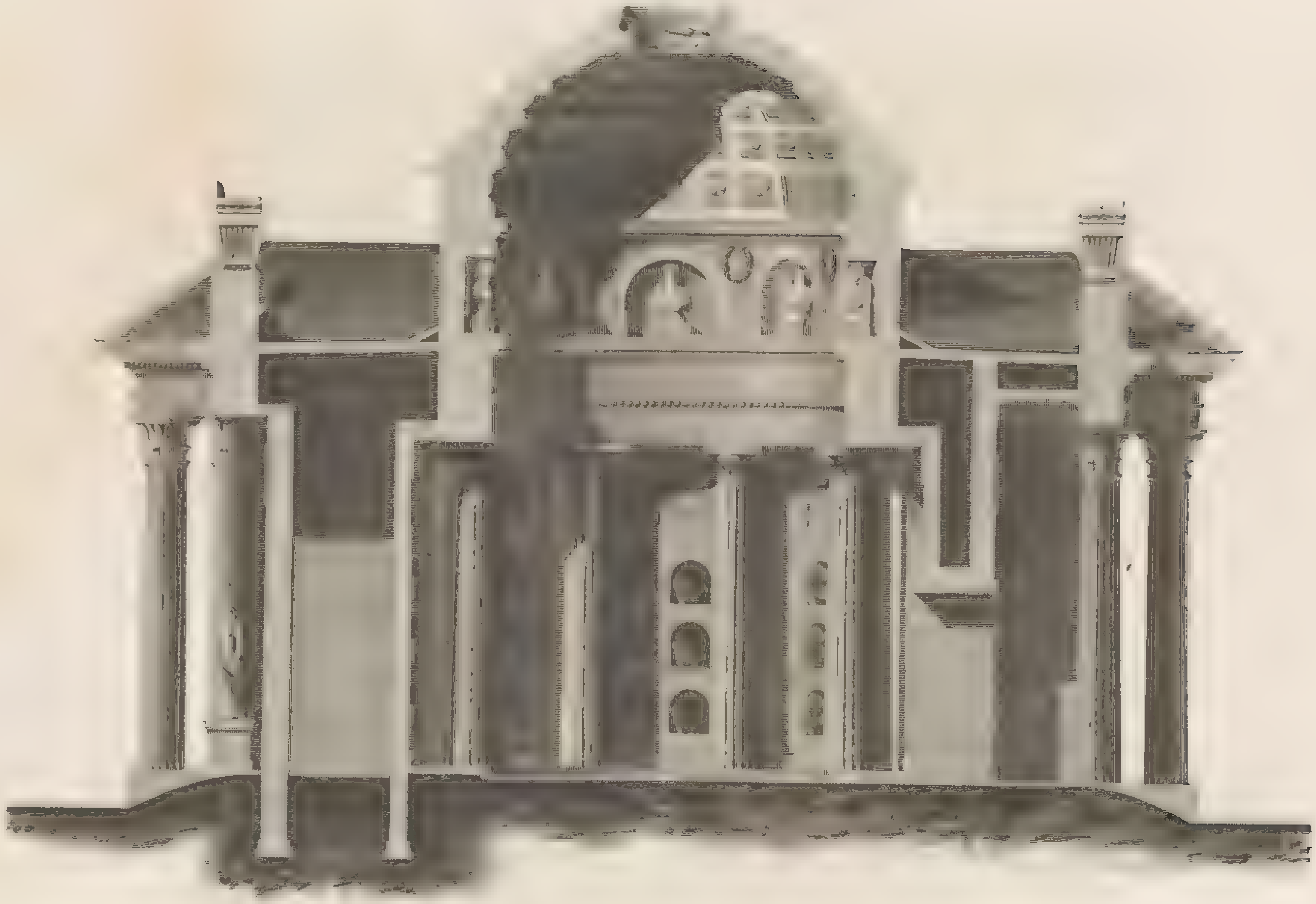
PLATE XXVII

ELEVATION OF A MAUSOLEUM.

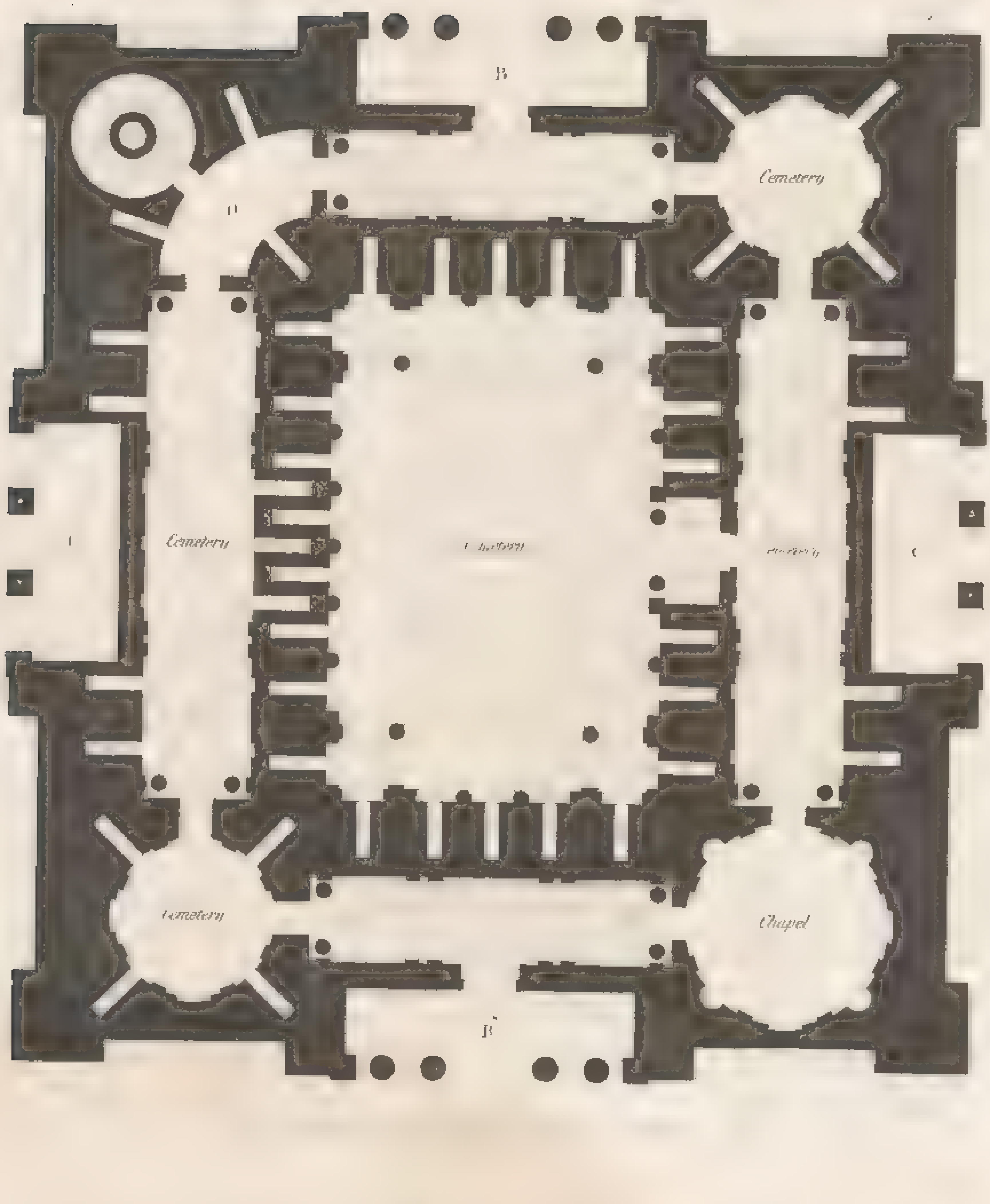
ed & Drawn by M.A.

PLATE XVI

SECTION OF A MAUSOLEUM



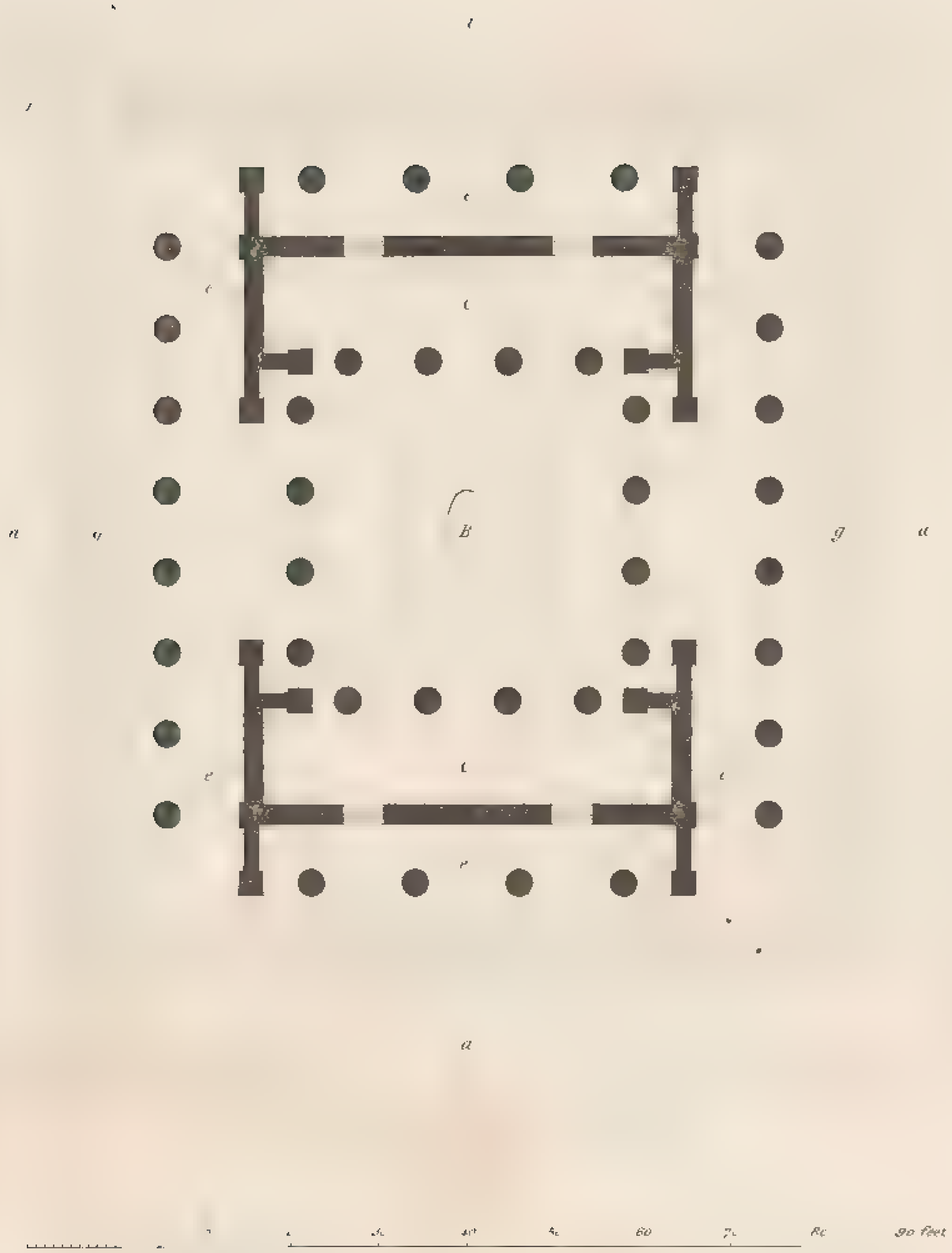
GROUND PLAN OF A MAUSOLEUM: P



Designed by M. A. Nicholson

London Published by Thos Kelly ... ster Row March 27 1824

UPPER PLAN OF MAUSOLEUM. P.



Designed &c. by M. A. Nicholson

Engraved by Edw.d Kennion

London, Published by Thos. Kelly 17 Paternoster Row, August 14th 1824.

19 feet 3 inches. Their proportion, 8 diameters, and they diminish about a sixth. The entablature is 3 feet 11 inches, or nearly one-fourth of the height of the column. The architrave is 1 foot 6 inches; the frieze, 10 inches; and the cornice, 1 foot 7 inches. The height of the pediment, exclusive of the cymatium, is one-fourth of the breadth of the frieze. For the real projections of the cornice and architrave, see the section through EF, on the preceding plan. In the central part of the front of the building is a sarcophagus, fluted on the face, with a wreath in the centre, and over its top two reverse scrolls, with a honeysuckle between them. On each side of the sarcophagus is an urn. These emblems, supposed to contain the ashes of the dead, were used by the antients in their mausoleums. Over the central part of the body of the building is a segment dome, on the top of which is an opening to admit light into the interior.

Plate XXIX.—Section *of the* Octagonal Mausoleum. This section is taken through EF, on the plan, and it exhibits the interior of the Chapel, and the cells, with the coffins in them. Over the top of the cells is a tablet, on which an inscription may be made.

The columns are of the Grecian Doric, and they are raised upon a step of about 6 inches high; their height is 17 feet 7 inches; they are six diameters high, and diminished at the top 13 minutes of the base. The Entablature is designed from the Monument of Thrasyllus, the height of which is one-third of the column.

Over the top of the entablature are semi-circular recesses, with busts, emblematic of those contained in the cells below. Over the top of these is a cornice, from which springs a semi-circular dome, with panels radiating from the apex. In the centre of the dome is a sky-light of a conical form, around which is a channel, with a hole perforated in it, for carrying off the rain.

The soffits of the porticos are panelled, with roses in the centre. On the left is a female statue, standing on a pedestal, with an urn in her left hand, and a reversed torch in the other.

Plate XXX.—Ground Plan *of another* Mausoleum. *(P.)*—BB, represent *Porches*, or entrances, with four columns, each 35 feet 6 inches by 8 feet 2 inches, in the clear; *dd*, groined passages to the chapel and cemetry, with antæ on the sides and columns at each extremity, 39 feet 4 inches in the clear of the columns, by 10 feet within the face of the antæ. Chapel, 25 feet diameter, with niches and antæ. Circular cemeteries, 20 feet diameter, each containing 8 cells marked *c*. Flank cemeteries, 57 feet 5 inches in the clear of the columns, by 12 feet 4 inches within the face of the antæ, containing together 20 cells,—*d*, winding staircase to the upper plan,—*eeeeeeee*, pedestals for figures to stand on.

CC, *Flank Porches,* with square pillars in front, 29 feet 6 inches, in the clear, by 10 feet 6 inches. The middle or largest rectangular cemetery, which is entered by a porch, from the flank cemetery to the right, between two pedestals supporting figures, is 60 feet within the face of the three quarter columns, by 38 feet, groined with four segmental arches, springing from the top of the entablature, which is carried round the top of the four insulated columns.

The central part is crowned with a dome of an elliptical form, with panels radiating towards the apex. In the centre of the dome is an opening to admit the light, and from which a lamp may be suspended. The spandrels below the dome are fluted.

Plate XXXI.—Upper Plan *of the* Mausoleum. *(P.)* The arrangement of this plan, above the steps, within the parapet, is *peripteral,* being nearly surrounded by columns. The intercolumniations of the front and back are of the *diastyle;* and those on the flanks and interior are of the *systyle: f,* shows the top of the winding staircase; *aaaa,* walk all round the building; *gg,* a flight of steps, leading to the interior, which is entered between the antæ within the flank columns; *eeeeee,* pedestals for figures to stand on; *cc,* rooms which may be appropriated to contain the relics of the deceased, 46 feet 3 inches by 10 feet 4 inches, in the clear.

Plate XXXII.—Front Elevation *of the* Mausoleum. *(P.)* The whole extent of this building, above the sub-plinth at the base, is 118 feet 4 inches. The central part, forming the entrance, is 50 feet 4 inches; the front of which is in a vertical face, and the sides of the projecting part in a sloping direction, having the appearance of an Egyptian entrance. The columns are designed from the Monument of Lysicrates; their height is 26 feet, and their diameter 2 feet 10¾ inches, raised 20 inches above the level of the ground, forming three steps. The entablature is 8 feet high, to the top of the ornament over the cornice. The frieze and architrave, 4 feet high, and converted into one face, in order to give it a more massy and solemn appearance; upon it are figures in bas-relief, of various devices.

The entrance, within the columns, is 15 feet high, 7 feet wide at the bottom, and 6 feet 2 inches at the top. The spaces on each side of the entrance, at the bottom, above the sub-plinth, are of 22 feet 6 inches, filled in with horizontal vermiculated rustics. The piers at each extremity are 11 feet 6 inches, diminishing on the front the same as on the flanks. Within the blocking-course, and 3 feet 6 inches below the top of it, is a walk all round the building, from which you ascend by a flight of steps, of 7 feet 9 inches high, to the inner part of the Mausoleum above. The projecting part of this, with the antæ at the extremities, is, in extent, 52 feet 4 inches. The height of the columns, 26 feet 2 inches, and their diameter 2 feet 10¾ inches. The width of the antæ is 2 feet 5 inches. The windows between the columns, in the clear, are 5 feet at the bottom, 4 feet 6 inches at the top, and 9 feet 4 inches high, filled in with trellis-work. In the centre intercolumniation is a figure, representing Hope or Charity, standing on a pedestal. The entablature over the columns is 6 feet 6 inches high, and the pediment 8 feet 4 inches.

The height of the attic, (which is formed on the flanks by *Caryatides* holding reversed torches and urns, standing on a plinth, and crowned with an entablature,) is 12 feet 6 inches high. Above the attic rises a base, which is nearly square; and, on the top of these, three steps are raised, with pedestals at each corner; and on the latter, figures or urns may be placed. The height of the base, steps, truncated pyramid, and ornament at the top, is 68 feet 8 inches.

Plate XXXIII.—Flank Elevation *of the* Mausoleum. *(P.)* The whole length of this front, above the sub-plinth, at the base, is 128 feet 5 inches. The central part, extending to the rustics, is 43 feet 9 inches. The parts, forming the rustics on each side of the centre, are each 31 feet 9 inches, and the extreme piers 10 feet 7 inches. The widths of the square pillars, forming the centre, are 2 feet 9 inches. The part which stands on the steps above show the entrance into the interior, and between the three central intercolumniations the tomb is seen, which denotes where the head of the family lies.

Plate XXXIV. represents a design for a Monument, in the Grecian style, erected, in the year 1806, in the parish church of St. Benet, Gracechurch-street, London, at the expense of the late James Townley, Esq. of Ramsgate, and of Paul's Chain, Doctors' Commons, to the memory of an affectionate father and mother, the former of whom was many years the Rector of St. Benet's. The design is by Mr. Elsam, the architect, and it was executed, under his direction, by Richard Westmacott, Esq., Sculptor and Royal Academician, for the sum of fifty pounds.

XXXV.—References to the Plate which represents the Roofs of St. Pancras Chapel, of St Luke's Church, and of Camden Chapel.

Figure 1.—*The Roof of the new Gothic Chapel of St. Pancras, Somers' Town, near London.*

Scantlings of Timbers.—A, Oblique Tie-beam, 11 inches by 7 inches; at bottom, 10 in. by 7 in., top cut asunder: B, Collar-Beam, 10 in. by 7 in.: C, Principal rafter, 10 in. by 7 in.; 9 in. by 7 in. at top: D, Common rafter, 5 in. by 2½ in.: E, Purlins, 6 in. by 7 in.: F, Pole-Plates, 5½ in. by 8½ in.: G, Struts, 6 in. by 7 in.: H, Braces, 8 in. by 7 in.: I, Oblique braces, 6 in. by 7 in.; K, Ribs to ceiling, 7 in. by 5 in.

FRONT ELEVATION OF MAUSOLEUM, P.

London, Published by Thos. Kelly, 17 Paternoster Row, May 8th 1824

FLANK ELEVATION OF MAUSOLEUM. P.

Designed by M. A. Nicholson.

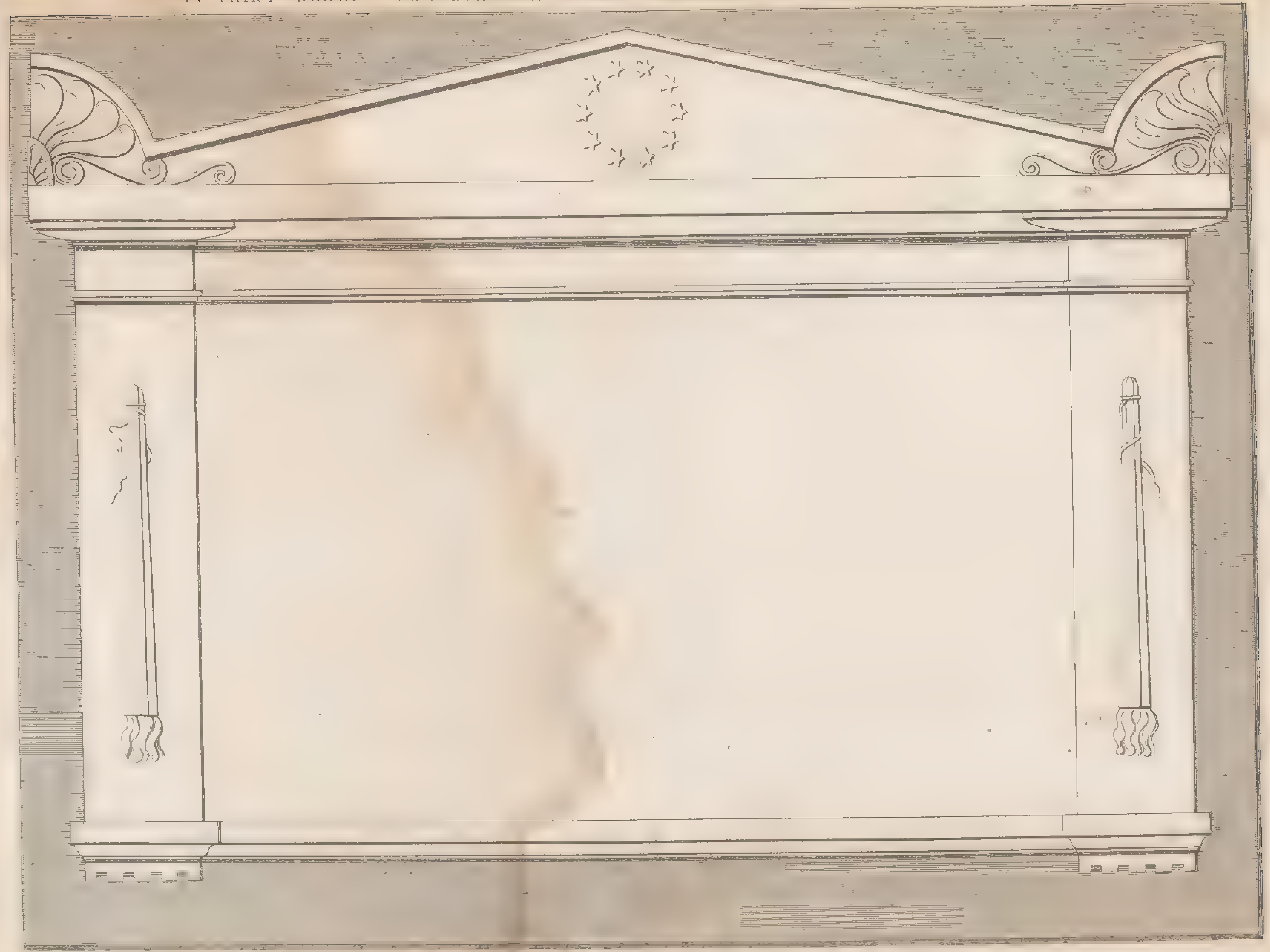
Engraved by R. Roffe

London, Published by Thos. Kelly, 17 Paternoster Row Feb. 1 1824

PLATE XXV

GRECIAN MONUMENT,

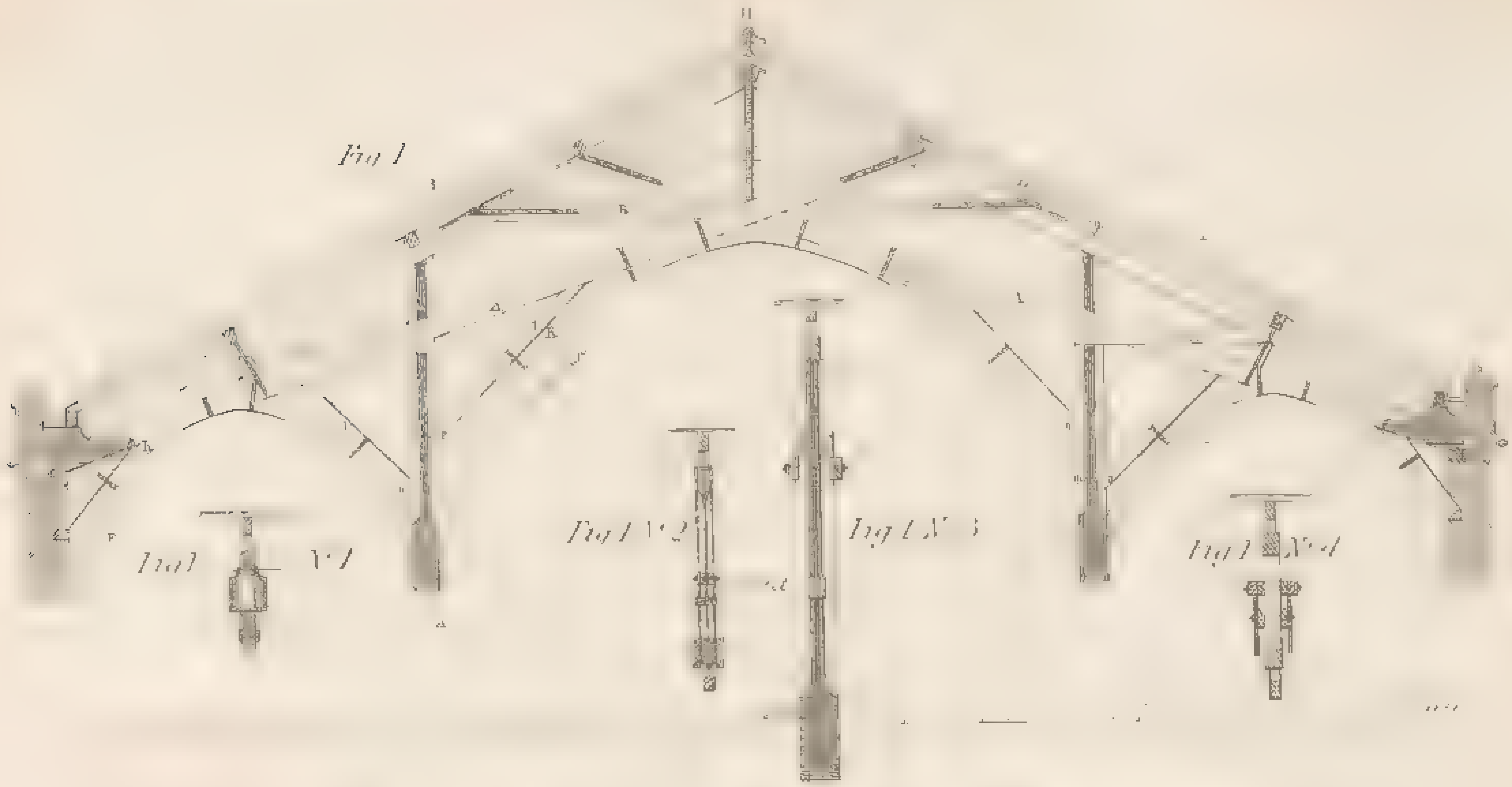
IN SAINT BENET'S GRACECHURCH STREET EXECUTED BY R WESTMACOTT ESQ R A



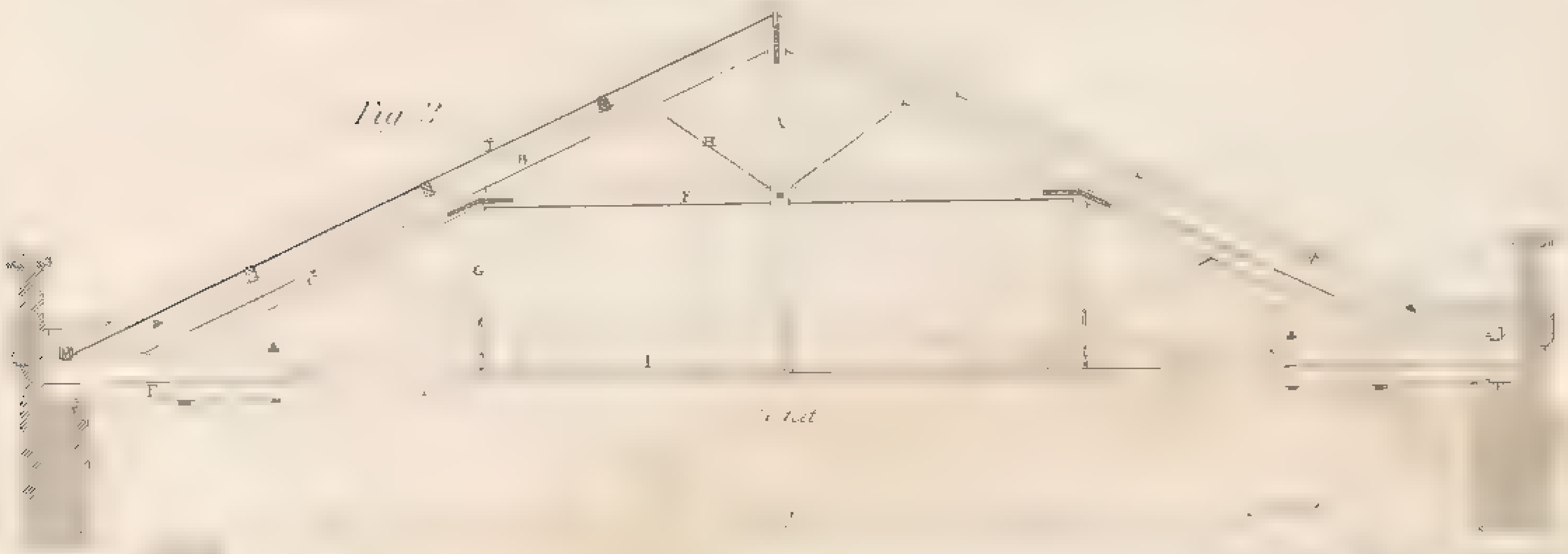
Wm Symns

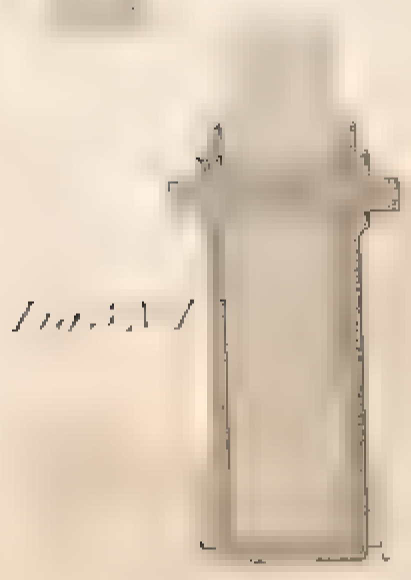
ROOF OF St. PANCRAS CHAPEL, SOMERS TOWN.

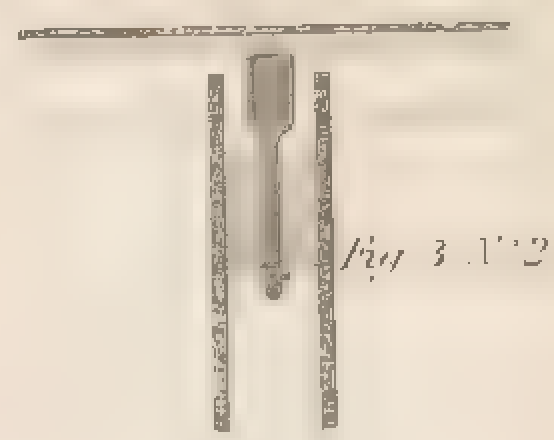
As executed by W & H W. Inwood. Esqs. Architects



ROOF OF St. LUKES CHURCH, OLD STREET.

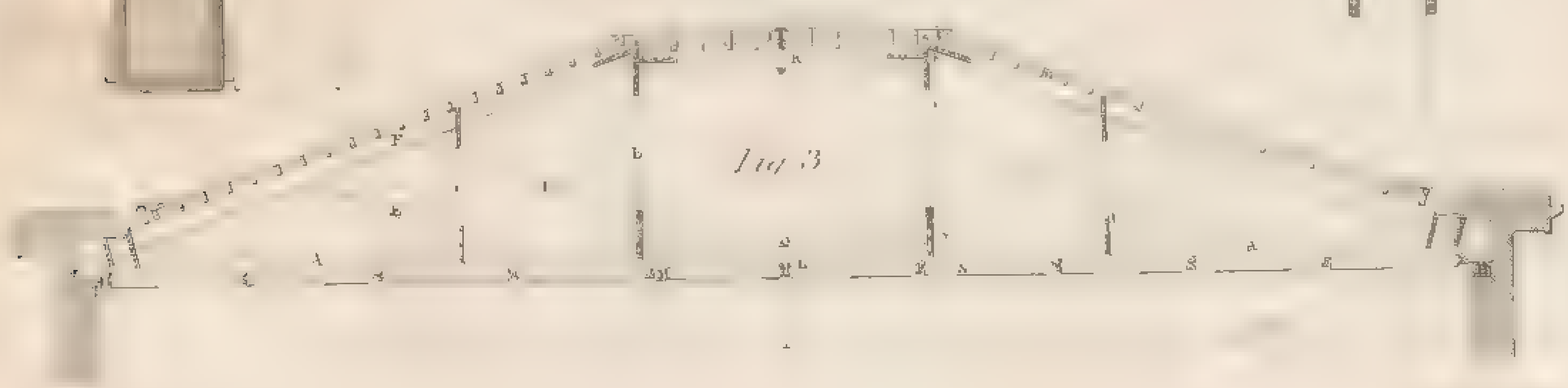






ROOF OF CAMDEN CHAPEL.

As executed by W. & H. W. Inwood, Esqs. Architects.



Drawn by M. A. Nicholson

London, Published by Thos. Kelly, 17 Paternoster Row June 12th 1824.

TRUSSES EXECUTED IN CAMDEN CHAPEL.

Fig. 1.

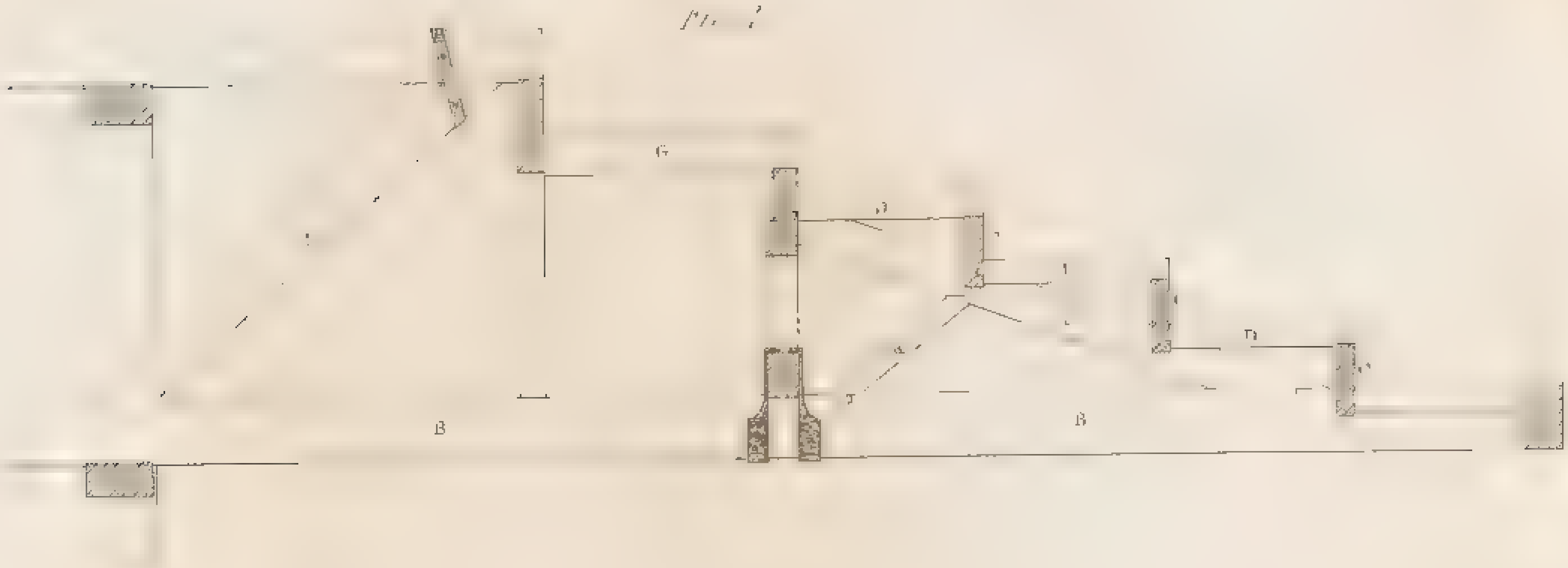


Fig. 2.

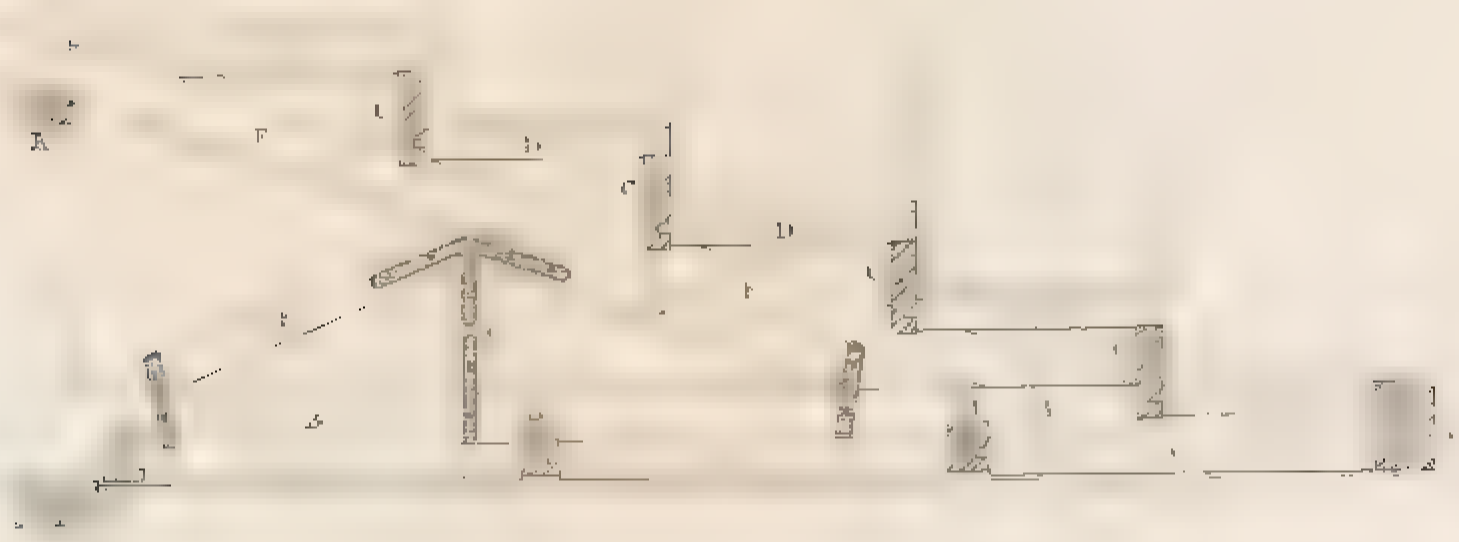


Fig. 3.

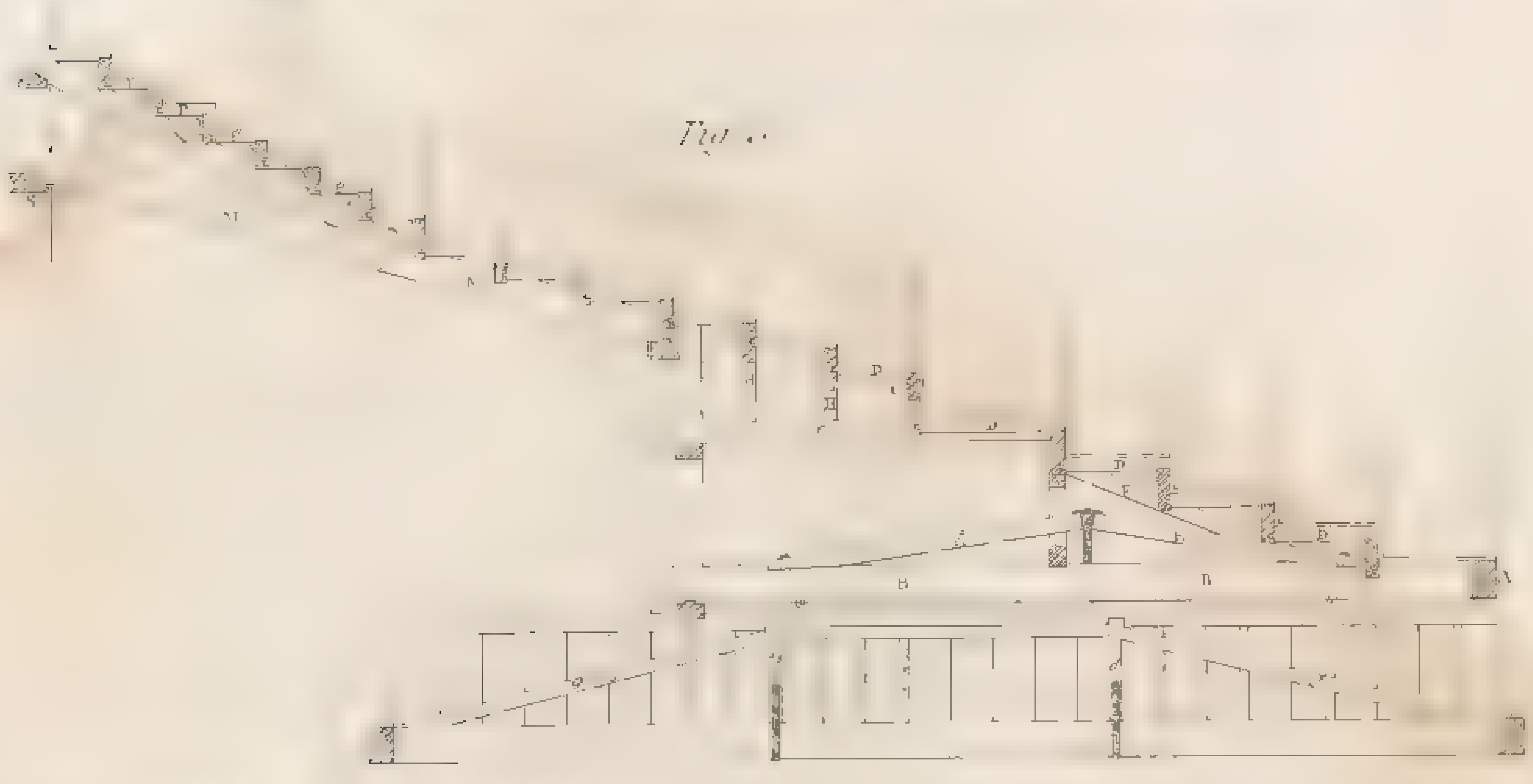
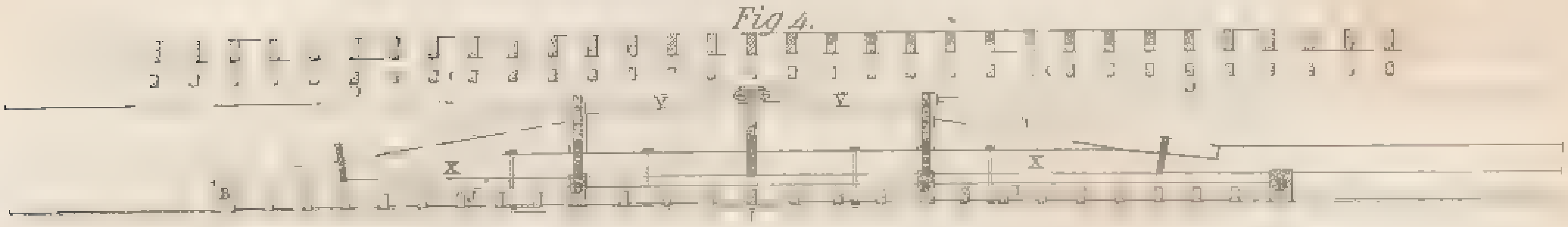


Fig. 4.



Drawn by M. A. Nicholson

London, Published by Thos. Kelly 17 Paternoster Row, Septr. 11th 1824.

DOORS.

Fig. 1.

Fig. 2.

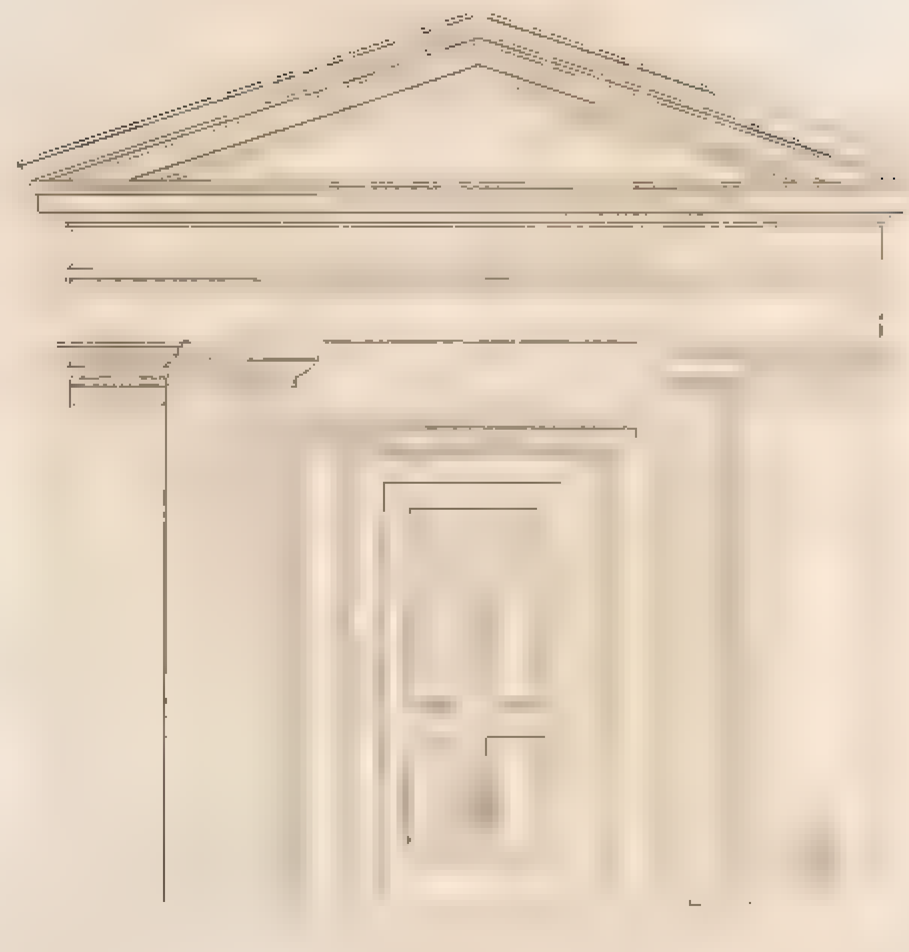
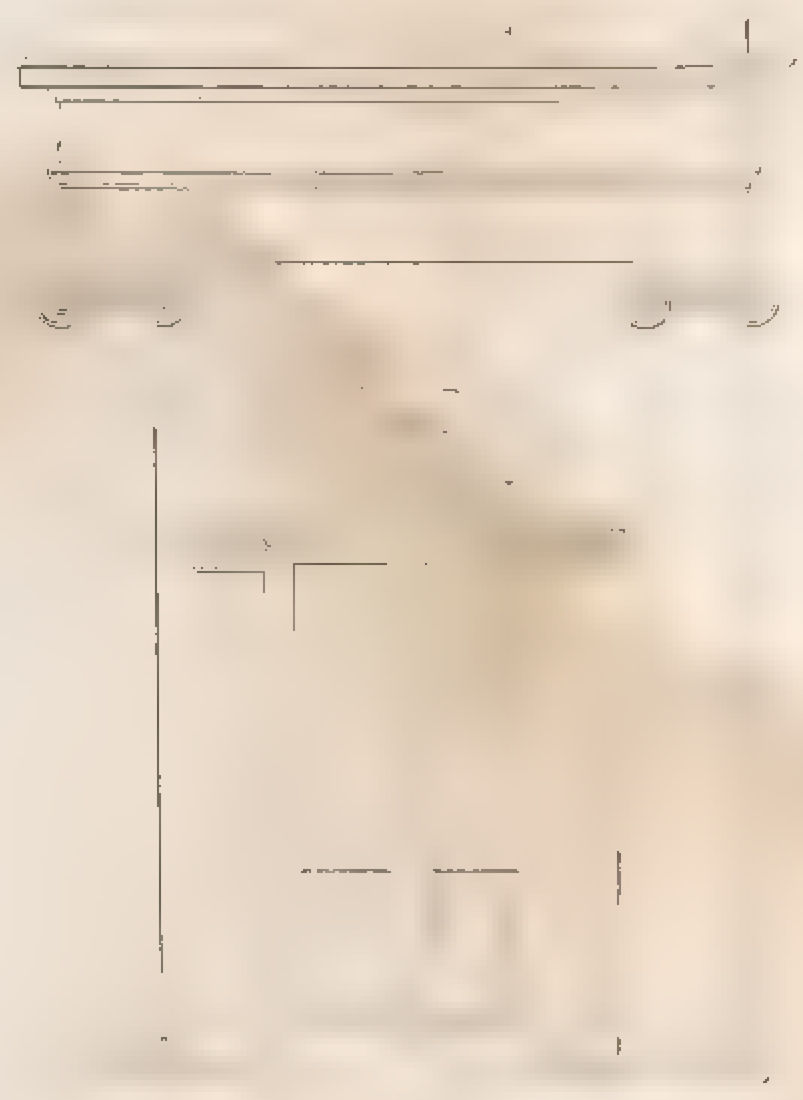


Fig. 3.

Fig. 4.



Drawn by M. A. Nicholson.

London, Published by Thos. Kelly, 17 Paternoster Row, November 1, 1824.

Fig. 1.

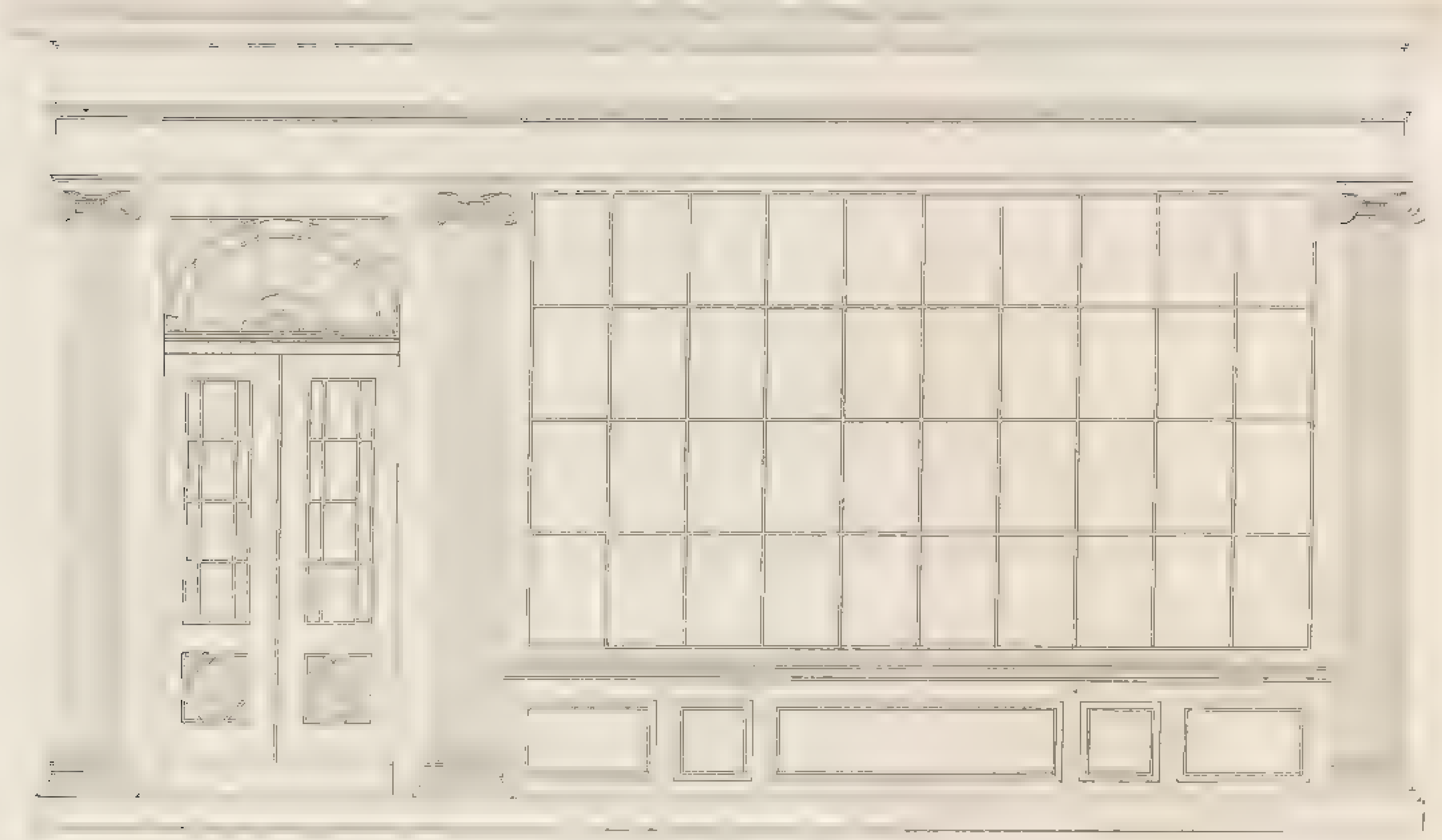


Fig. 2.

Drawn by M.A.Nicholson. Engraved by W. Symms

London, Published by Thos. Kelly, 17 Paternoster Row, January 1 1823.

SHOP FRONTS.

Fig. 1.

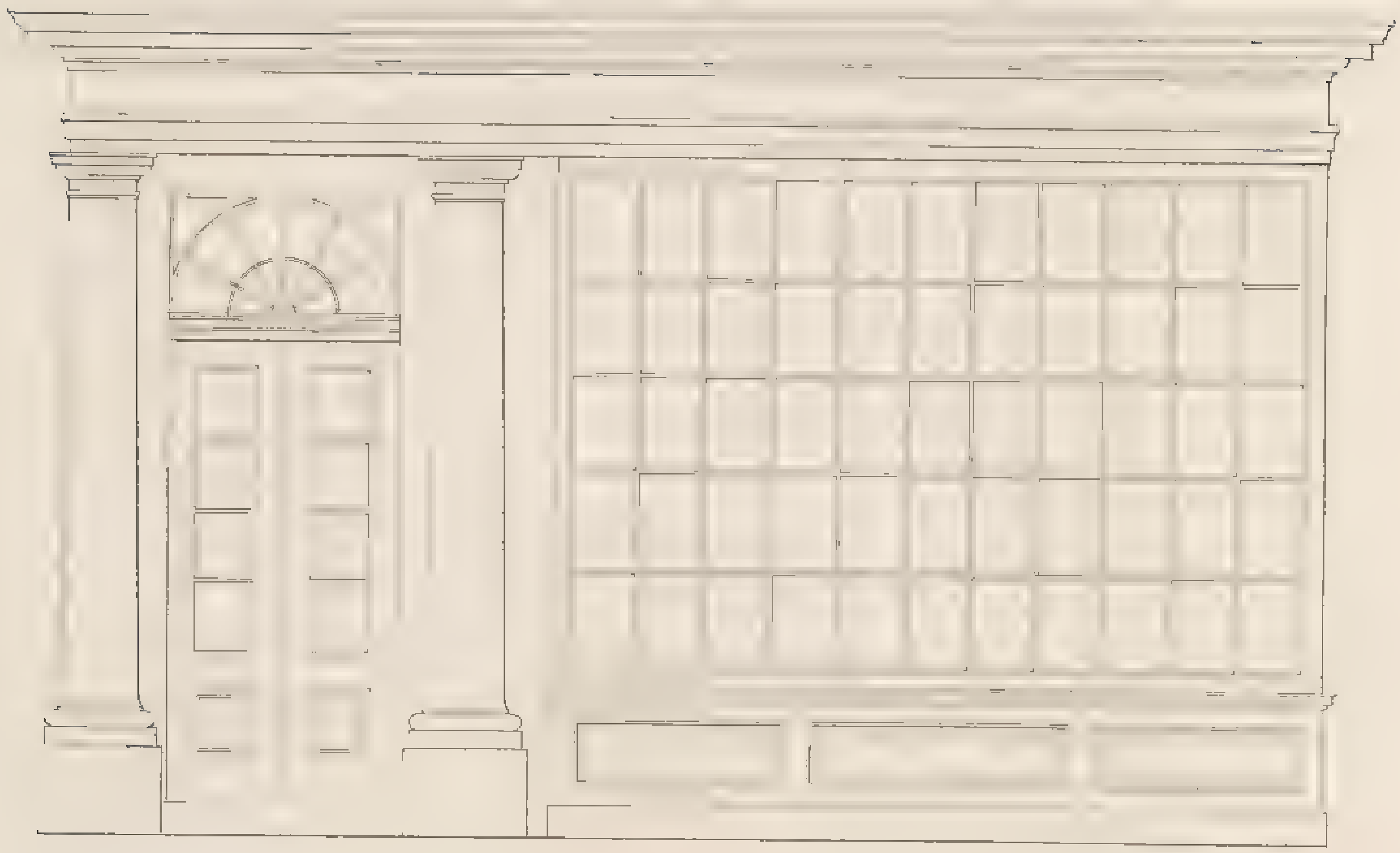
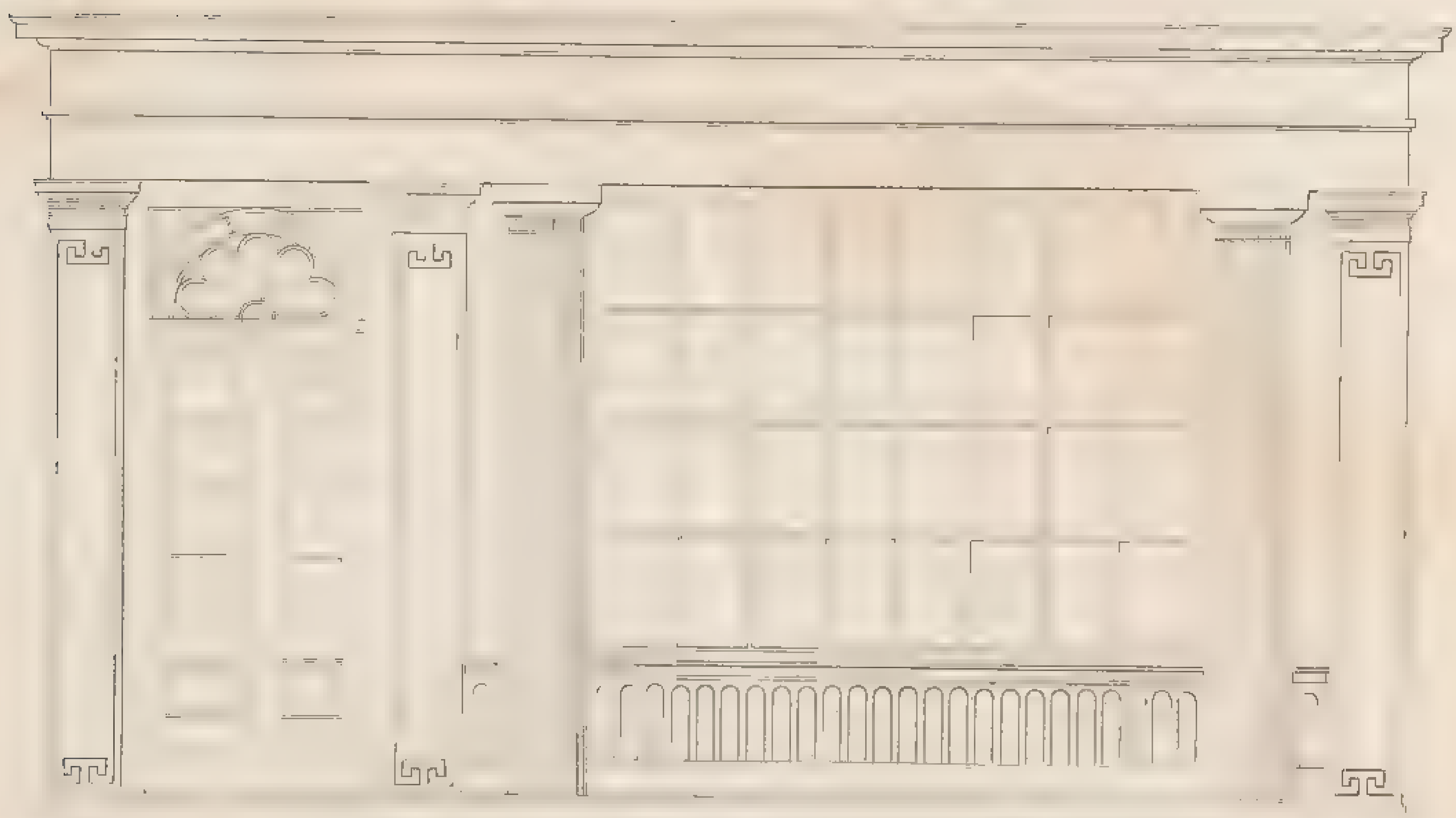


Fig. 2.

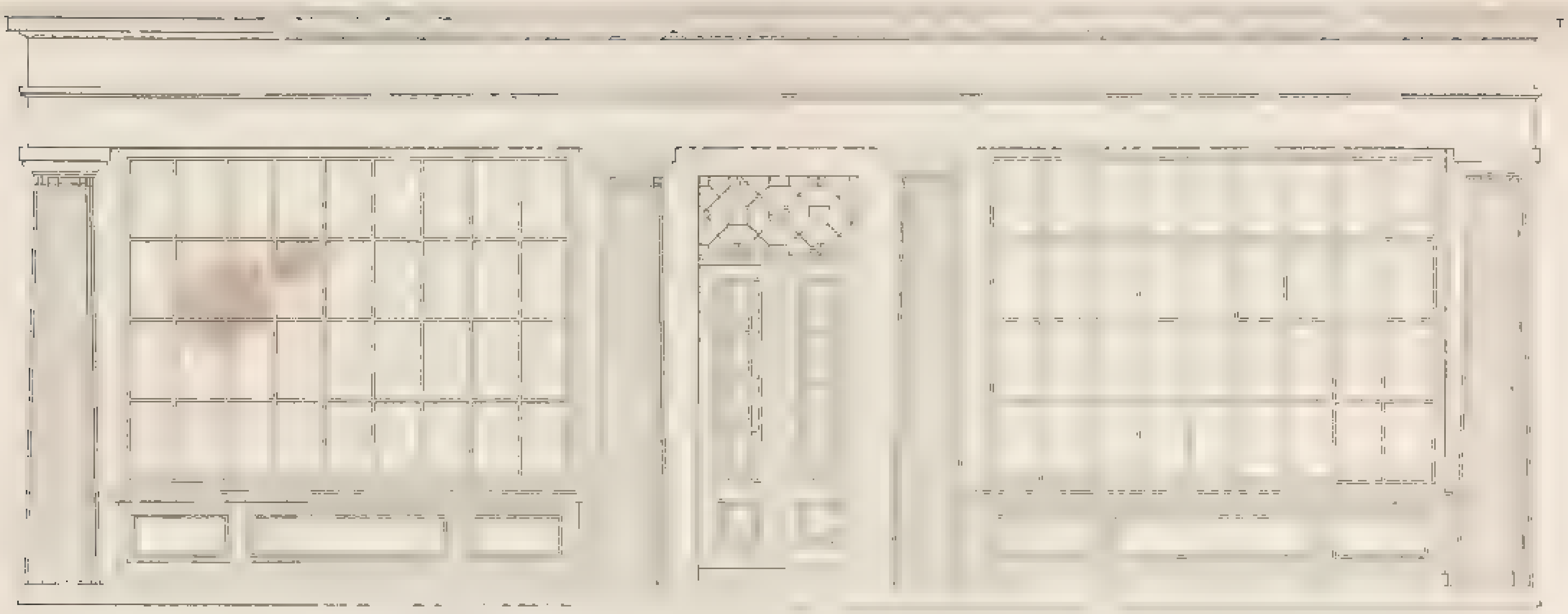


Drawn by M. A. Nicholson *Engraved by [illegible]*

London Published by Tho. Kelly 17 Paternoster Row November 1 18[illegible]

SHOP FRONTS.

Fig. 1.



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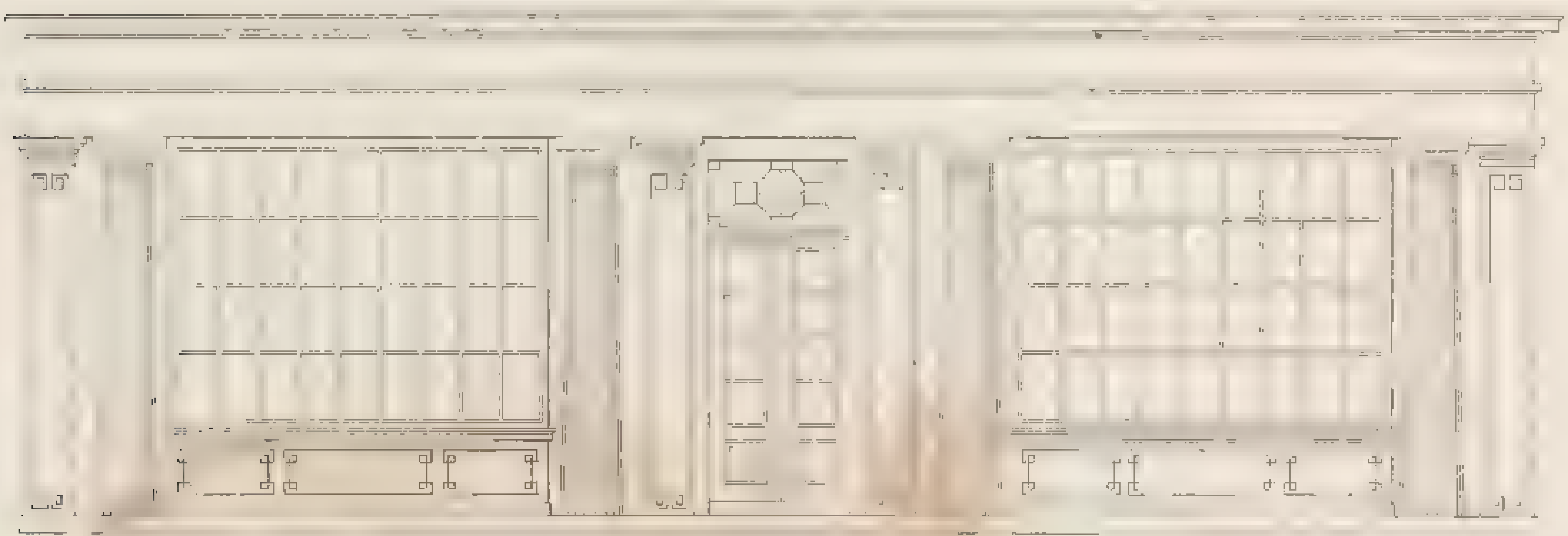
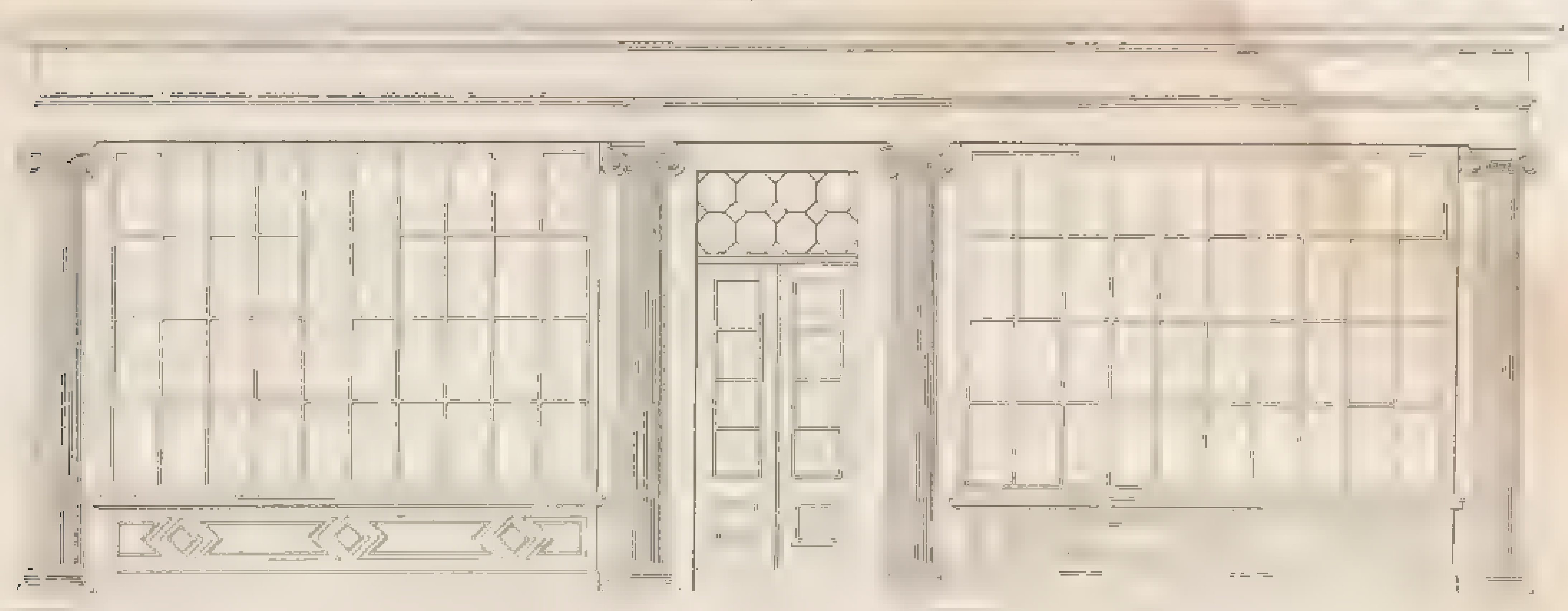


Fig. 3.



Designed by M.A. Nicholson

London Published by Thos Kelly, 17, Paternoster Row December 1, 1822

WINDOWS.

PLATE

Drawn by M.A. Nicholson.

London, Published by Thos Kelly, 17 Paternoster Row, November 1, 1824.

Figure 1, *No.* 1, Section through EF, to a larger scale.
Figure 1, *No.* 2, Section through GH, to a larger scale.
Figure 1, *No.* 3, Section through AB, to a larger scale.
Figure 1, *No.* 4, Section through CD, to a larger scale.

Figure 2.—Roof of St. Luke's Church, Old Street, London.

Scantlings of Timbers.—A, Double King-post of Oak, 9 inches by 5 inches each: B, Principal rafter, 8 in. by 7 in. at top, 6 in. by 7 in. at bottom: (N.B. *Very slight:*) C, Assisting rafter, 6 in. by 7 in.; D, Tie-beams, 14 in. by 12 in.: E, Hammer-beams, 12 in. by 12 in.; F, Stretching-beams, 10 in. by 8 in.: G, Queen-Posts of oak, 10 in. by 7 in.: H, Struts, 5 in. by 5 in.: I, Common rafters, 5 in. by 3 in.: K, Purlins, 8 in. by 6 in.; L, Wall-plates 12 in. by 8: M, Poll-plates, 6 in. by 6 in.; Ridge-boards, 12 in. by $2\frac{1}{2}$ in.; Hips, 12 in. by $2\frac{1}{2}$ in.

Figure 3.—Roof of Camden Chapel, Camden Town, near London.

Figure 3, *No.* 1, Section through *ef*, to a larger scale.
Figure 3, *No.* 2, Section through *cd*, to a larger scale.

Scantlings of Timber.—A, Tie-beam, 14 inches by 9 inches: B, Queen-posts of oak, 8 in. by 7 in.: C, Small Posts of Oak, 7 in. by 7 in.: D, Struts, 7 in. by 7 in.: E, Small Struts, 6 in. by 6 in.: F, Principal Rafters, at top, 9 in. by 7 in.; at bottom, 11 in. by 7 in.: G, Common Rafters, 6 in. by $2\frac{1}{2}$ in.; Horizontal Rafters to Flat, increased in depth to produce a proper current, 8 in. by 5 in.: H, Wall-Plate, 9 in. by 6 in.: J, Truss to Collar-beam, 5 in. by 3 in.: K, Collar-beam, 10 in. by 7 in.: L, Spiked to the sides of Tie-beam, 8 in. by 2 in.: M, Binders, 8 in. by 5 in.: N, Ceiling-joist, $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in.: O, Abutment-piece, 5 in. by 5 in.

XXXVI.—Reference to the Plate of Trusses, lately executed in Camden Town Chapel, near London.

Figure 1.—*Truss to the Gallery at the west end, bearing on the Tower wall.* H, Strut, 8 inches by 6 inches: J, Trimmer, 9 in. by 6 in.: K, Small Strut, 5 in. by 4 in.

Figure 2.—*Truss to side Galleries.* A, Bressummer, 10 inches by 8 inches: B, Girder, 10 in. by 8 in.: C, Binders, 13 in. by $3\frac{1}{2}$ in.; D, Bridging-joist, $4\frac{1}{2}$ in. by 3 in.; E, Truss, 6 in. by 4 in.: F, Carriage, 8 in. by 4 in.: G, King (Oak), 4 in. by 4 in.: H, Binders to Ceiling-joists, 7 in. by 5 in.: J, Ceiling-joists 3 in. by $2\frac{1}{2}$ in.: K, Plate, 8 in. by 5 in.: L, Wall-plate, 12 in. by 6 in.

Figure 3.—*End Gallery and Children's Gallery.* A, Bressummer, 10 inches by 8 inches: B, Girders, 10 in. by 8 in.: C, Binders, 13 in. by 3 in.: D, Bridging-joist, 4 in. by 3 in.: E, Truss, 6 in. by 4 in.; F, Carriage, 8 in. by 5 in.: G, Bearer, 7 in. by 4 in.: H, Puncheons, $3\frac{1}{2}$ in. by 3 in.: J, Binders to Ceiling-joists, 7 in. by 5 in.: K, Ceiling-joists, $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in.: L, Plates, 9 in. by 6 in.: M, Oblique Girder, 12 in. by 8 in.: N, Carriage, 8 in. by 6 in.: O, Binders, 10 in. by 3 in.: P, Bridging-joist, 4 in. by 3 in.; Q, Binders to Ceiling-joists, 7 in. by 5 in.: R, Ceiling-joist, $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in.: S, Plate, 12 by 8 in.

Figure 4.—*Truss to the west end Gallery.* T, Trusses, 6 inches by $4\frac{1}{2}$ inches: V, Strainers, 5 in. by $4\frac{1}{2}$ in.: X, Abutment-piece, at each end, 9 in. by 6 in.; ditto, in the middle, $7\frac{1}{2}$ in. by 6 in.

XXXVII, XXXVIII, XXXIX; Designs for Shop-Fronts, Plates I, II, and III.; Windows, IV. and V.; and a Chimney-piece, VI.

These designs for Shop Fronts, &c. in the present improved style, are too clear to require more than a simple notice. The adoption of either, in preference to the others, will, of course, depend on taste and local circumstances.

Plate VI. of this series, represents a design for a Grecian Chimney-piece, adapted for a Dining Room. The ornaments in the pilasters represent ripe fruit: the tymphan of the pediment an antique wreath, with ribbons, the extremities of which are terminated by Grecian heads, taken from models in the British Museum. The design is by Mr. Elsam, the architect, under whose direction it has been executed by Peter Turnerelli, Esq., an eminent sculptor, many years patronized by the Royal Family and the most distinguished personages in these countries.

XL.—Design *(on two plates) for a* County Court-House *and* Prison; *by Mr. Elsam, the Architect.* The Design to which the explanation applies, has been studied with reference to all the conveniences which are usually required in Buildings of this description. It embraces the *Civil and Criminal Courts of Justice*, together with *Grand and Petty Jury-Rooms, Judges' Retiring-Rooms, Water-Closets, Witnesses'-Rooms, Clerks'-Offices*, &c.; adjacent to which Building are the proposed Prisons, consisting of a *Gaoler's-House, Turnkeys'-Lodge, Prison Buildings* for *Debtors* and *Felons*, with a *Chapel, Infirmaries, airing grounds, passages*, and avenues of communications to the Court-House, and every requisite appendage for 300 prisoners. The entire of the Prisons, it is proposed, should be enclosed by an external and an internal boundary wall, to prevent the possibility of intrigues being carried on by persons from the outside, to effect escapes. Estimated expense, £70,000.

The arrangements of the interior of the *Court-House*, it is presumed, will not be considered injudicious; inasmuch as the two Courts of Justice are detached from each other, by a spacious and well lighted circular Hall in the centre, which will admit of the most spacious communications with every part of the building, not only on the ground-floor, but also in the upper story, wherein a Gallery is proposed to communicate with all the upper apartments, consisting of the Grand Jury's Dining-Room, Sheriff's-Offices, and such other conveniences as may be deemed requisite for the County Records; including rooms for the Housekeeper and attendants.

The Prison consists of four wings, springing from a central building, which comprises several well-sized apartments, with a circular staircase in the centre, and passages of communication to every part of the building; each of which apartments, with the Chapel at the top, have windows diagonally situate, and commanding full views of the several Court-Yards; so that each Class of Prisoners may be inspected, not only on the ground-floor, but from each of the upper stories; and, as this part of the building is intended chiefly for the use of the resident Gaoler, or Inspector, it is presumed, that a Prison built upon this plan could not fail, with due attention, to be minutely inspected, and consequently very secure: more especially, when it is considered, that the approaches to the central point are, by means of the external avenues and the divisional passages, to be ascended by flights of steps; and, as shown, the internal Court-Yards in the form of quadrants, are intended to be elevated several feet above the Prisoners' airing grounds, in order to afford the Inspector, or Gaoler, the most convenient opportunities of viewing the interior of the Prisoners' Court-Yards, between the circular iron railings.

The Turnkey's-Lodge is proposed to be situate in the centre of the principal front of the boundary-wall, and is intended to comprise suitable apartments for the Principal Turnkey and his family, with a hot and cold bath, fumigating-room, and store-room for County cloathing, besides a place for public executions on a lead flat at the top.

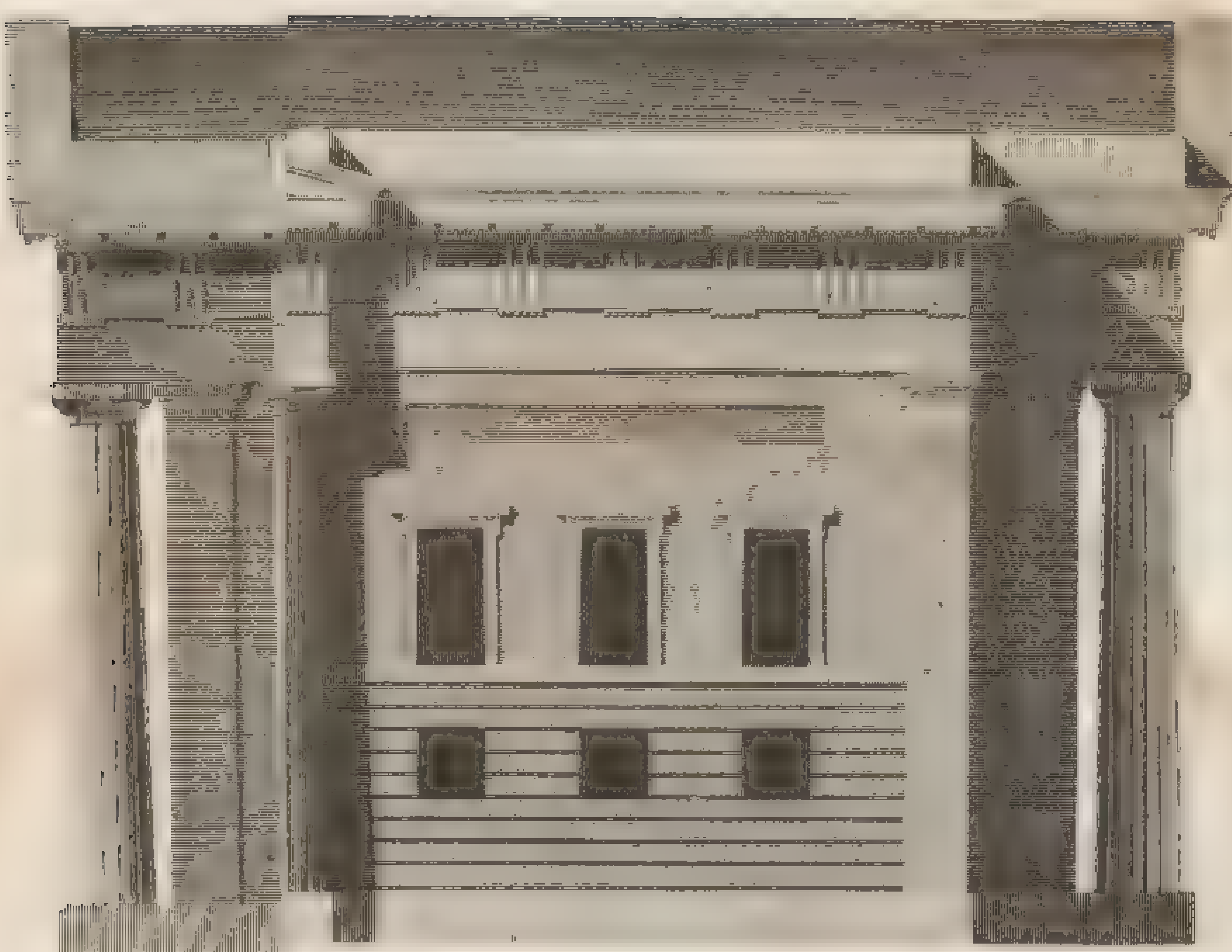
The Four Wings, or Prison Buildings, are each of them divided in the centre by a building similar to the central building before described, the former of which are intended for the under Turnkeys, and the superior description of Prisoners; each of which buildings have, also, circular staircases in their centres, with passages of communication to the several airing grounds, dining-halls, and work-rooms, which should be flagged or groined over in brick-work, and suitably fitted-up for the purposes intended. The upper stories of the several prison buildings are each alike; and, in the event of the design, or any portions thereof, being carried into effect, the spaces above stairs should be divided into the same number of compartments as the

DESIGN FOR A GRECIAN CHIMNEY PIECE.

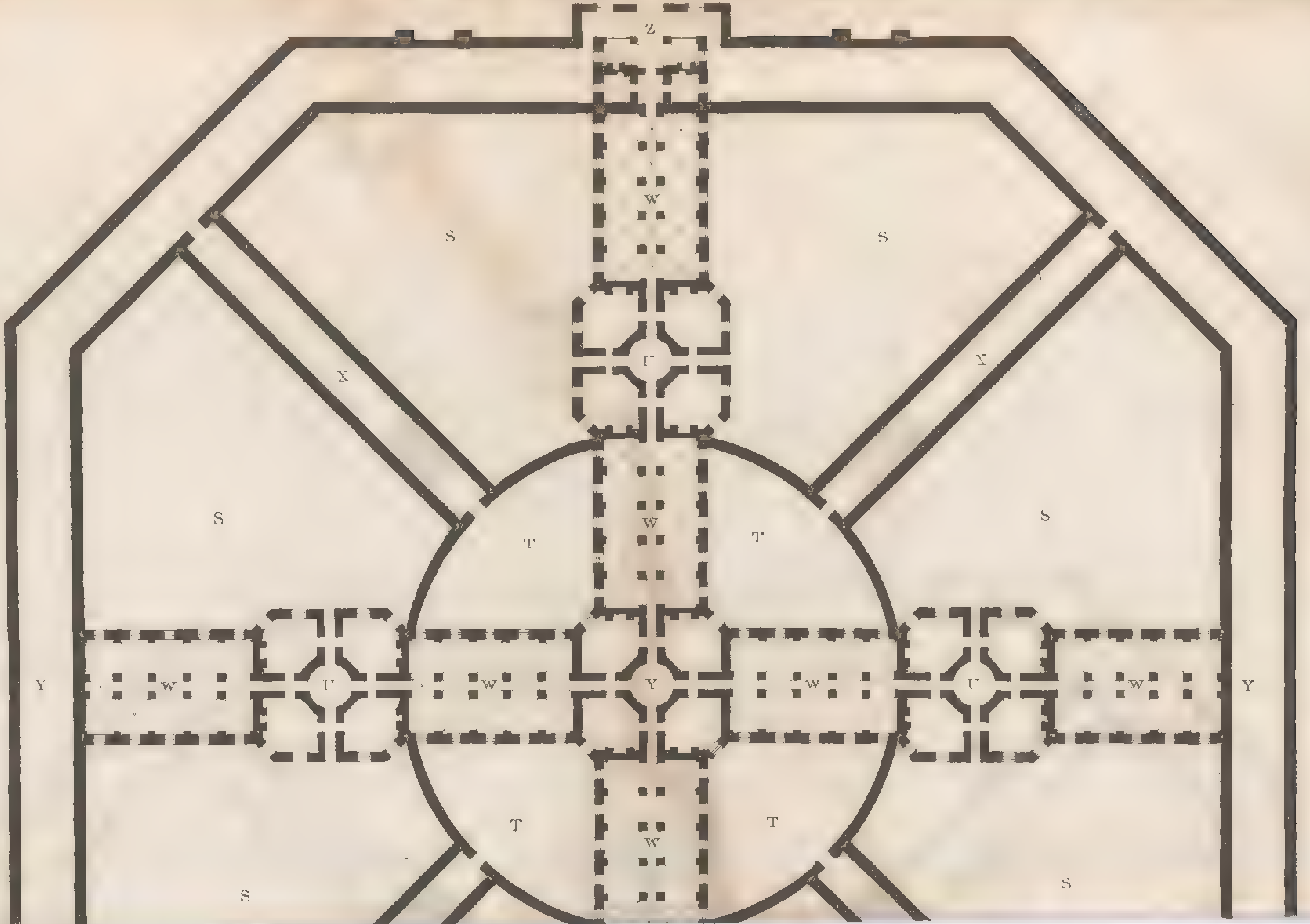
EXECUTED BY PETER TURNERELLI ESQ SCULPTOR TO HIS LATE MAJESTY GEO III

Drawn & invented by R. Brown Archt

RISONS.



DESIGN FOR A COUNTY COURT HOUSE AND PRISONS.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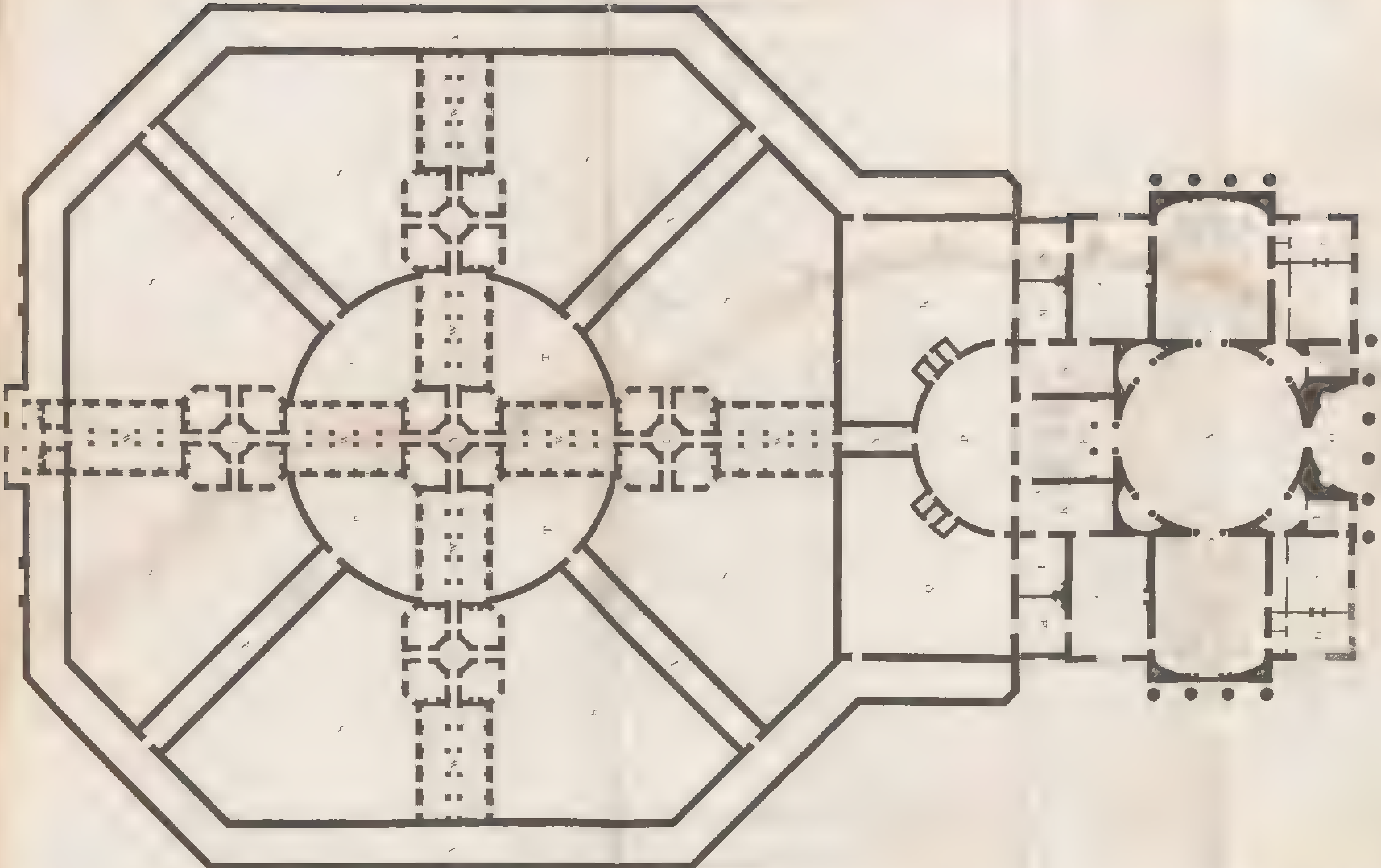

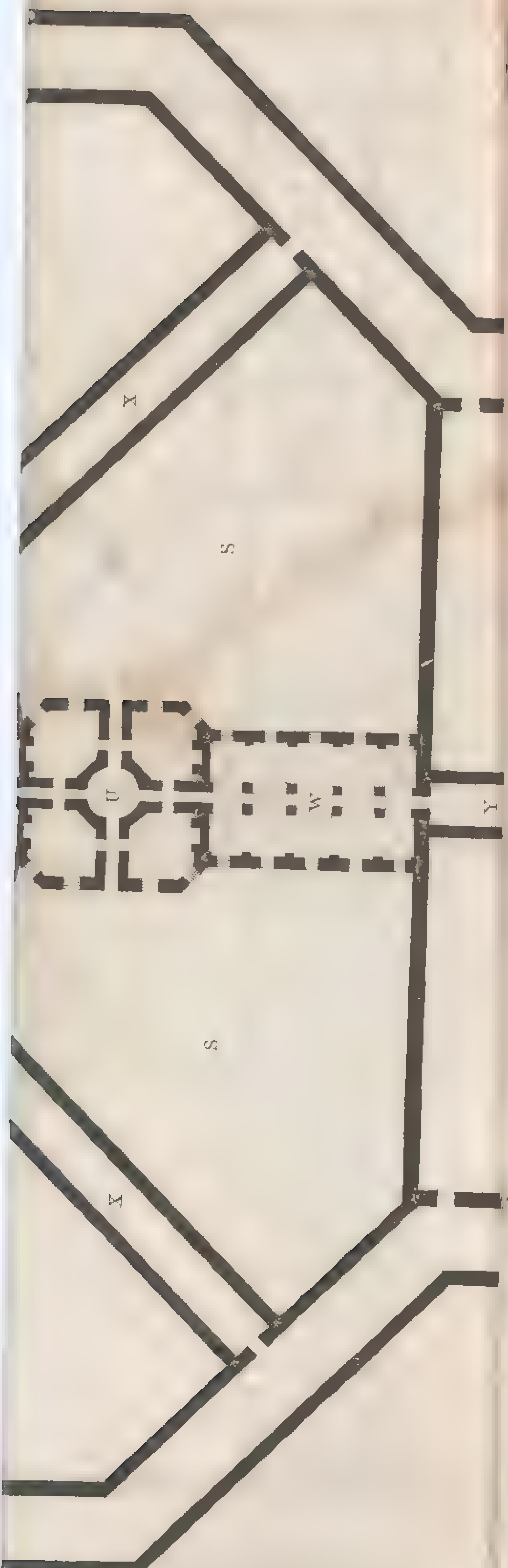
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ELEVATION

of a small County Prison

*Designed by R. Elsam Arch^t^* [illegible]

London Published by Thos Kelly 17 Paternoster Row, June 19th 1824

groined arches or piers represent, which will produce the same number of sleeping cells on each of the three upper stories; and these, being flagged or vaulted over, and secured with barred iron window gratings, and strong door locks and bolts, may be considered perfectly secure.

The uppermost stories of the centre buildings comprise the Infirmaries; and the lead flats, over the right and left hand wings, the airing places, for the convalescent to walk upon. Water-Closets should be provided within the buildings, and the utmost care taken to ventilate and well drain. If the Prison is situate near a running stream, it will be the more desirable, both as regards the health of the Gaoler and his inmates. This, and the mode of drainage, are subjects of the greatest importance; as is also the acquirement of good and wholesome spring water, which should be pumped daily into a central reservoir for the use of the Gaoler and his family, as well as for the numerous persons who may at times be confined within the walls of the Prison.

References to the Ground Plan.—A, Great Hall: B, Criminal Court: C, Civil, or Nisi Prius Court: D, Judges' Retiring Rooms: E, Petty Jury's Retiring Rooms: F, Staircases: G, Grand Jury Room: H, Clerks' Room: I, Witnesses' Room: K, Waiting Rooms: L, Clerk of the Peace's Office: M, Witnesses' Room: N, Clerks' Rooms: O, Portico: P, Yard of communication, with Privies: Q, Yard for females about to be tried: R, Yard for males about to be tried: S, airing grounds for eight classes of prisoners: T, Inspection-yards: V, Gaoler's house: U, Under-Turnkey's, and superior prisoners: W, Dining Halls and Work Rooms: X, Gaoler's passages of communication: Y, avenues between the boundary walls: Z, Turnkeys' Lodge, &c.

XLI.—Design *(on two plates) for a* Small County Prison; *by Mr. Elsam, the Architect.*—The Design which accompanies this explanation, was executed at Cavan, in Ireland, in the year 1810, and cost £12,000. Since that period it has been adopted, with some deviations, in various parts of the United Kingdom; and latterly, the Design has been laid before the Prison Committee of the House of Commons, and other public bodies, who have been pleased to testify their approbation of the principle of its arrangements: and these circumstances have induced the author to extend its publicity, through the medium of this work, in the hope that it may induce other professional men to elicit their ideas upon the subject.

The Plan comprises three wings, besides a central building, called the *Gaoler's house*, with a Turnkey's Lodge, situate in the principal front of the boundary-wall, which encloses the different airing grounds and the several buildings, as before described.

The centre building, on the ground floor, comprises the *Gaoler's apartments*, from whence the principal Court-Yards may be inspected. The first floor comprises the *Chapel*, to be divided and sub-divided as occasion may require; and the second floor, the *Infirmary*, to be divided in like manner. This building will also afford suitable accommodation for two or three female debtors.

The *Left Wing* will accommodate 16 debtors, with sleeping rooms in the upper stores; besides a spacious day room on the ground floor, which should be fitted up with every convenience the place will admit of, to ameliorate the condition of this class of unfortunate persons.

The *Right Wing* will also accommodate 16 prisoners, with sleeping cells in the upper stories, to be divided, as described in the references, for persons under their respective sentences; as likewise those for misdemeanors.

The *Rear Wing* will also accommodate 16 prisoners, accused of felony, with separate sleeping cells in the upper stories, besides day rooms on the ground floor; for each of which classes, the plan provides separate airing grounds, with detached privies.

The *Staircase*, in the centre, will communicate with every part of the building, through which the different classes of prisoners are proposed to be removed, alternately, from their respective day rooms and sleeping apartments, every morning and evening: by which arrangement it will be difficult for any prisoner to make an escape, and in this respect, the plan is different from any other design of the same description.

The *Turnkey's Lodge,* provides apartments for that officer, with sleeping cells for female felons, King's evidences; a room for county cloathing, a hot and cold bath, and a place for public executions in the most conspicuous part of the building: attached to which, are two airing grounds under the inspection of the Turnkey.

By the preceding distributions, it will be seen that a prison, built upon this plan, will conveniently lodge and secure from 50 to 60 prisoners, in the ratios of persons usually confined in small County Prisons, where the number of debtors, and the proportionate quantity of other prisoners, do not require an extensive classification.

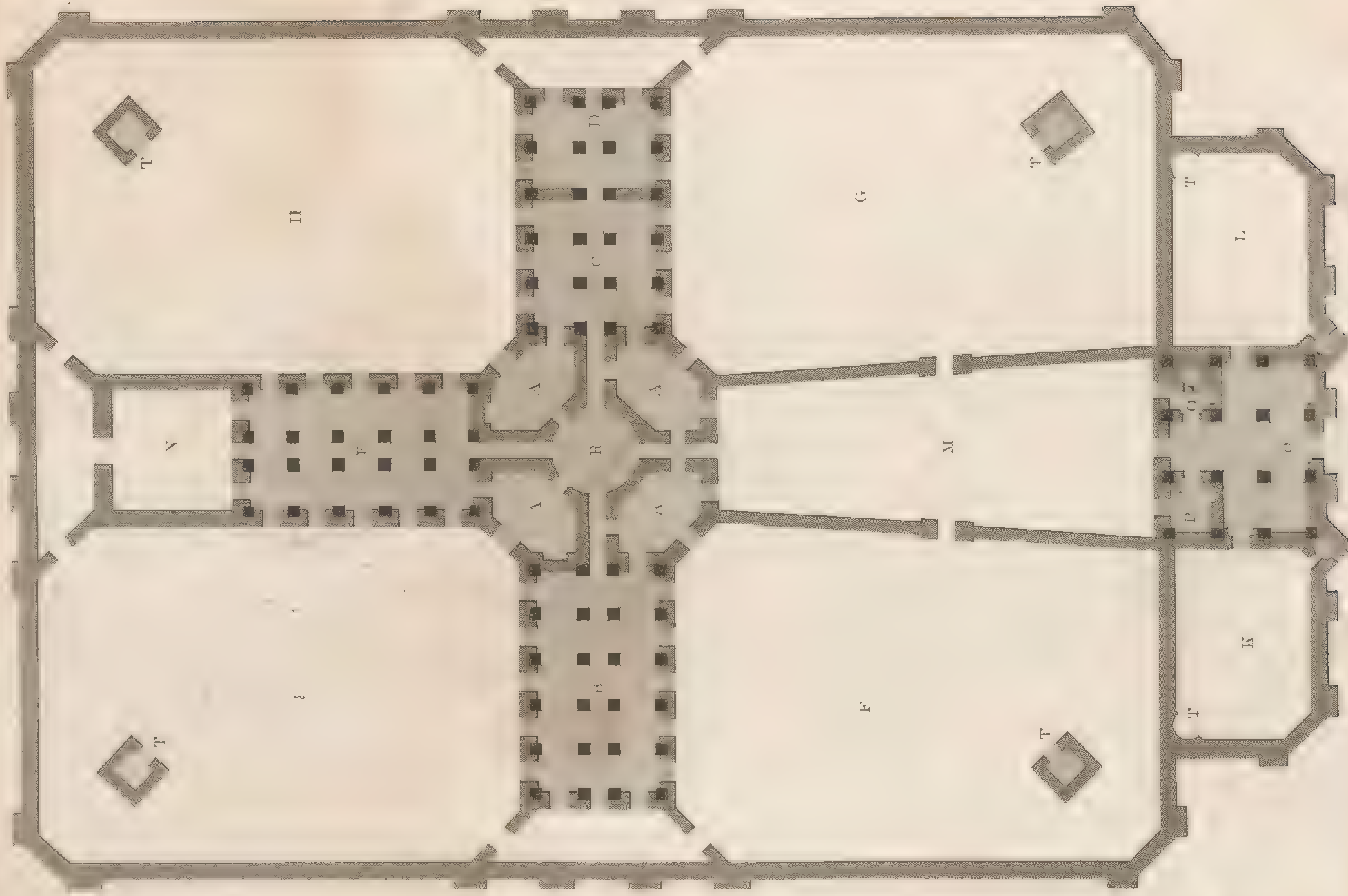
References to the Ground Plan.—A, Gaoler's Apartments: B, Debtors' Day Room: C, Misdemeanors Day Room: D, Day Room for Prisoners under sentence: E, Day Room for accused Felons.

F, G, H, I, K, L, M, N, Airing Grounds: F, for Debtors: G, for Misdemeanors: H, for Prisoners under sentence: I, for accused Felons: K, for King's evidence: L, for women Felons: M, for female Debtors: N, for refractory Prisoners: O, Turnkey's Hall, or Lodge: P, Hot and Cold Baths; Q, Fumigating Room, with an oven: R, Staircases: T, Privies.

The sleeping apartments for the Debtors, and cells for the Felons, are proposed to be in the upper stories; this is recommended, not only for the sake of security, but likewise to produce a free ventilation throughout, which cannot be better effected, than by the alternate removal of each class of prisoners from their several day rooms and sleeping apartments every morning and evening, in the manner before described, by means of the central staircase.

GROUND PLAN

of a small County Prison.



GLOSSARY OF TECHNICAL TERMS AND GENERAL INDEX,

WITH REFERENCES TO THE PAGES IN WHICH THE VARIOUS PARTICULARS ARE EXPLAINED; AND INCLUDING AN EXPLANATION OF SUCH TERMS AS HAVE NOT ALREADY BEEN PARTICULARLY DEFINED.

AARON'S ROD; an ornamental figure, representing a rod with a serpent twined about it, and, called by some, though improperly, the *Caduceus* of Mercury.

Abacus; the upper member of a capital of a column, serving as a kind of crown piece in the Grecian Doric, and a collection of members or mouldings in the other Orders. See *Q. Orders, plate* I., and page 467.

Abreuvoir or Abrevoir, in Masonry; the joint or junction of two stones; or the space or interstice to be filled up with mortar or cement. *Abreuvoir* also signifies a Bathing House or Place.

Abutment or Butment; 218, 328.

Acanthus; a plant, the English *Bear's Breech*, the leaves of which are represented in the capital of the Corinthian Order, &c. *Acanthine* means ornamented with leaves of the acanthus.

Accessories; in architectoral composition, those parts or ornaments, either designed or accidental, which are not apparently essential to the use and character of a building.

Accompaniments; subordinate buildings or ornaments.

Accouplement, in carpentry; a tie or brace, or the entire work when framed.

Acropolis; from the Greek: the highest part of a city, the citadel or fortress. The Acropolis, or citadel, of Athens is frequently noticed in the present work.

Acroterium; (plural, *Acroteria*) the extremity or vertex of any thing; a pedestal or base placed on the angle, or on the apex of a pediment, which may be for the support of a vase or statue.

Ædes; among the antients, an inferior kind of temple.

Ægis; in decoration, a shield or breast-plate, particularly that of Minerva.

Ægricanés; sculptures representing the heads and skulls of rams; commonly used as a decoration of antient altars, friezes, &c.

Æneatorés; sculptures representing military musicians.

Aërial Perspective; the representation of objects, weakened and diminished in proportion to the distance from the eye.

Ætoma; a pediment, or the *tympanum* of a pediment.

Aile or Aisle; a walk in a church, on the sides of the *nave*; the wings of a choir.

Air-trap; an opening for the escape and admission of air.

Alcove; a recess or part of a chamber, separated by an *estrade*, or partition of columns, and other corresponding ornaments.

Arœostyle; the greatest interval or distance that can be made between columns.

Æosystyle, see page 466.

Alto-relievo or High-relief; that kind or portion of sculpture which projects so much from the surface to which it is attached, as to appear nearly insulated. It is therefore used in comparison with *Mezzo-relievo*, or Mean-relief, and in opposition to *Basso-relievo* or Low-relief.

Amphitheatre; a spacious edifice, of a circular or oval form, in which the combats and shows of antiquity were exhibited.

Amphora (plural, *Amphoræ*); a vase or earthen jar, with two handles; among the antients, the usual receptacles of olives, grapes, oil, and wine. Hence, in decoration, *Amphoral* means shaped like an amphora or vase.

Amulet; in decoration, a figure or character to which miraculous powers are supposed to be attached, and which particularly distinguished the bulidings of Egypt.

Ancon; in decoration, a curved drinking cup or horn. The arm of a chair.

Anconés; ornaments depending from the corona of Ionic door-ways, &c. The trusses, or *consoles*, or brackets, sometimes employed in the dressings of apertures, as an apparent support to the cornice, upon the flanks of the architrave.

Angels; brackets or corbels, with the figures or heads of angels.

Angle-Bar; the upright bar of a window, constructed on a polygonal plan, standing at the meeting of any two planes of the sides. A mullion.

Angle-Bracket. See *Bracketing*.

Angle-Chimney; a chimney in the angle, or in a side formed at an angle of the apartment.

Angle-Float. See *Float*, 390.

Angle-Rafter; in carpentry, otherwise Hip-rafter. See *Hip*.

Angular Capital; the modern Ionic or *Scammozian* capital, which is formed alike on all the four faces, so as to return at the angles of the building.

Annular-Vault; a vault rising from two circular walls; the vault of a circular corridor.

Annulet or Fillet; a small square member in the Doric capital, under the quarter-round. See *Orders*, O, Plate I. It is also used to imply a narrow flat moulding, common to the various parts of the columns, particularly their bases, capitals, &c.

Antæ; a species of pilasters common in the Grecian temples, but differing from pilasters, in general, both in their capitals and situation. See page 509, and *Orders, plates* XIII, XIV, XX, XXIV.

Apartments or Rooms, usual form of, 430.

——————, fancy or fanciful, 432.

——————, proportions of, 437.

——————, suite of, 436.

Apertures of Doors and Windows, proportions of, 436.

Apron, in plumbing, the same as *Flashing*.

Arabesque or Moresque; something done after the manners of the Arabians or Moors, and destitute of human and *animal* figures.

Arcade; an aperture in a wall, with an arched head: it also signifies a range of apertures with arched heads. Arcades are frequently constructed as porticos, instead of Colonnades, being stronger, and less expensive. In the construction, care must be taken that the piers be sufficiently strong to resist the pressure of the arches, particularly those at the extremities. The arcades of the Romans were seen in triumphal arches, in theatres, amphitheatres, and aqueducts, and frequently in temples. They are common in the piazzas and squares of modern cities, and may be employed, with great propriety, in the courts of palaces, &c. For an application of the Orders to Arcades, see Plate XCII, annexed to the plates of *Orders*, but erroneously numbered.

Arc-boutants, or Boutants; arch-formed props, in Gothic churches, &c. for sustaining the vaults of the nave; their lower ends resting on the pilastered buttresses of the aisles, and their upper ends resisting the pressure of the middle vault, against the several springing points of the groins. They are, at times, called *flying-buttresses, arched buttresses*, and *arch-butments*.

Arch; a part of a building supported at its extremities only, and concave towards the earth or horizon: but arches are either circular, elliptical, or *straight*: the last being so termed, but improperly, by workmen. The terms *arch* and *vault* properly differ only in this, that the arch expresses a narrower, and the vault a broader, piece of the same kind.

Arches; definition, 328, 428: Scheme Arch, 428; Semi-circular Arch, 428: Arch in *Carpentry*, 109. In *Masonry*, description of the sections of, 316: parabolic, 316; curve of, how to describe, 317. In *Stone-cutting*, a semi-circular right arch, 318; elliptical arch with splayed jambs, 319; to find the joints of, 319; oblique circular arch, 321; oblique arch, 323; a semi-circular arched passage, between two semi-circular arched vaults, 324; an archway, revealed and splayed, &c. 325.

Arches, straight; heads of apertures which have a straight intrados in several pieces, with radiating joints, or bricks tapering downwards.

Archway.—See *Arch*, above.

Architectonic; something endowed with the power and skill of building, or calculated to assist the architect.

Architecture, antient, of Great Britain, recognized as the Gothic, Saxon, and Norman, modes of building, 514.

Architrave; a beam; that part of an entablature which lies immediately upon the capital or head of the columns. See pages 311, 444, 445, 453, 465, 467.

Archivault or Archivolt; 444: of the arch of a bridge, 328.

Arena for Stairs, 440.

Arris, 218: Arrises, 442.

Ashlar, 328: Ashlaring, 310.

Ash Timber, 260.

Astragal, 468, 469: and *M and fig.* 9, *Orders, pl.* I.

Axiom, Axioms, Geometric, 14, 15: In Perspective, 420.

B.

Back; generally that side of an object which is opposite to the face, or breast: but the *back of a handrail*, is the upper side of it; that of a rafter, is the upper side of it in the sloping plane of one side of a roof.

Back-shutters, or back-flaps; additional breadths hinged to the front-shutters, for completely closing the aperture, when the window is to be shut.

Back of a slate, 402.

Bagnio; the Italian name for a bath, or bathing-house: answering to the Greek *Balaneia*, and the Latin *Balneum*.

Balcony (from the French *Balcon*); an open gallery, projecting from the front of a building, and commonly constructed of iron or wood. When a portico or porch is surmounted with a balcony, it is commonly of stone, with iron or wood. *See Plates of Elevations*, I, III, IV, V, XV.

Baluster; a small kind of column or pillar, belonging to a *Balustrade*.

Balusters, in Joinery, 200.

Balustrade; a range of *Balusters*, supporting a cornice, and used as a parapet or screen, for concealing a roof or other object.

APPLICATION OF THE ORDERS TO ARCADES.

Fig. 1.

Fig. 2.

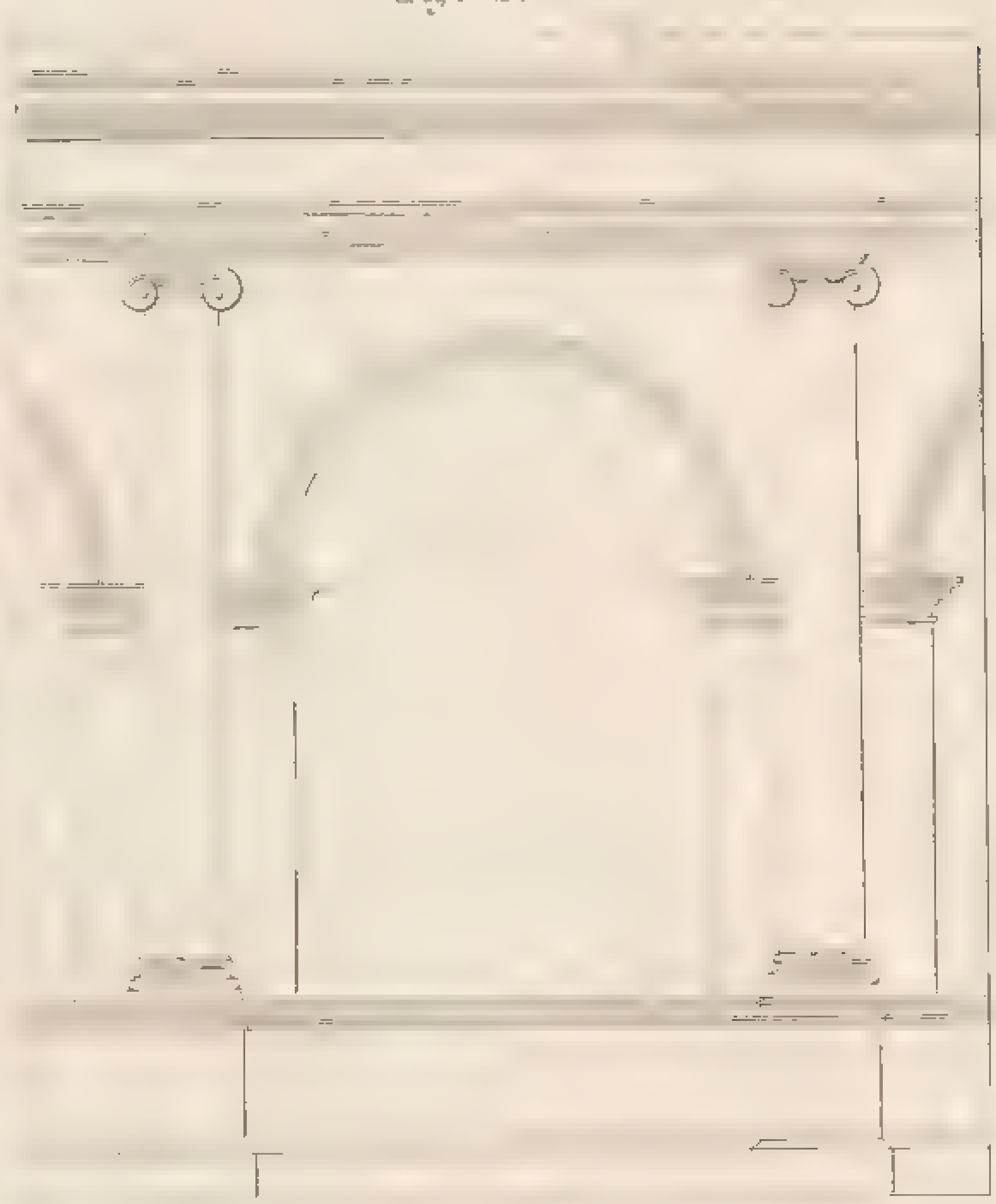


Fig. 3.

Fig. 4.

Drawn by M. A. Nicholson

Collar; a ring or cincture.
Collar-beam, 127.
Colonnade; a range of columns, whether attached or insulated, and supporting an entablature.
Column, 453, 465.
———, step of, 466.
Columns, diminution of, 166, 459.
———, in joinery, flutes and fillets of, 167.
——— and their proportions, in masonry, 308.
Colours for painting, &c., table of, 412; catalogue and description of, 413.
Comparted; divided into smaller parts; or partitioned into smaller spaces.
Compo or Compos, 390.
Composite Order, 452, 454, 498: References to the plate of, 503.
Composition, in plastering, 382.
Cofferdam or Batterdeau, 328.
Conic Sections, 82; definitions in, 82; the ellipse, 83; hyperbola, 94; parabola, 102.
Conservatory; a superior kind of Greenhouse, for valuable plants, &c., arranged in beds of earth, with ornamental borders.
Console; a bracket or projecting body, shaped like a curve of contrary flexure, scrolled at the ends, and serving to support a cornice, bust, vase, or other ornament. Consoles are also called, according to their form, *ancones* or *trusses*, *mutules*, and *modillions.*
Continued; uninterrupted; unbroken; as a continued attic, pedestal, &c., not broken by pilasters or columns.
Contour; a French word for *Outline.*
Coping; the stones laid on the top of a wall, to strengthen and defend it from injury.
Corbeils; carved work, representing baskets filled with fruit or flowers, and used as a finish to some elegant part of a building. This word is sometimes used to express the bell or vase of the Corinthian capital.
Corbels; a horizontal row of stones or timber, fixed in a wall or on the side of a vault, for sustaining the timbers of a floor or of a roof; the ends projecting out six or eight inches, as occasion may require, in the manner of a shoulder-piece, and cut at the end according to fancy, in form of an ogee, &c.; the upper side being flat. In the castellated style of architecture, the *Corbels* are a range of stones, projecting from a wall, for the purpose of supporting a parapet or superior part of the wall, which projects beyond the inferior part.
Cornice; a crowning; any moulded projection which crowns or finishes the part to which it is attached. The Cornice of an order is a secondary member of the order itself, or a primary member of the entablature. The latter is divided into three principal parts, and the upper one is the *cornice.*
Cornices, 310, 444, 445, 453, 466.
Cornices, in bricklaying, 358, 375, 376.
Corinthian Order, 451, 454, 504; references to the plate of the, 508.
Cornucopia; the horn of plenty; represented in sculpture under the figure of a large horn out of which issue fruits, flowers, grain, &c.
Corona, Larmier, or Drip, 443, 469, 470, 474.
Corridor; a long gallery or passage around a building, and leading to the several apartments.
Counter-forts; projections of masonry from a wall, at certain regular distances, for strengthening it or resisting a pressure.
Counter-guage, in carpentry; a method of measuring joints by transferring the breadth of a mortise to the place of the other timber where the tenon is to be made.
Counter-lath, in tiling; a lath placed, by eye, between every two guaged ones, so as to divide every interval into two equal parts.
Country-house. See *Villa.*
Country Residences; best situations for, 448, 449: arrangements of, 449.
County Court-House. See *Prison*, and p. 575.
Coupled Columns; those disposed in pairs, so as to form a narrow and wide interval alternately.
Couples; rafters framed together in pairs, with a tie, which is generally fixed above the feet of the rafters.
Course; a continued level range of stones or bricks, in a wall, &c.
Course of Bricks, 390. Coursing Joint; the joint between two courses.
Cove; any kind of concave moulding; also the concavity of a vault. Hence, a *coved and flat ceiling* is a ceiling of which the section is a portion of a circle, springing from the walls, and rising to a flat surface.
Covent-Garden, the church of, 482.
Cover, in slating; the part of the slate that is hidden: the exposed part being called the margin.
Cover-way, in roofing; the recess or internal angle left to receive the covering.
Covered-way; a passage arched over.
Covering of solids, 107; of circular roofs, 130; of polygonal roofs, 146.
Coverings for roofs, comparative state of the weight of, 398.
Coves and Cornices, bracketing for, 138.
Coving; an exterior projecture, in an arched form, now disused. The covings of a fire-place are the inclined vertical parts on the sides, so formed for contracting the space, &c.
Crockets; in the pointed style of architecture, the small ornaments placed equi-distantly along the angles of pediments, pinnacles, &c. See *Elevations*, pl. IX.
Crosettes, in decoration; the trusses or consoles on the flanks of the architrave, under the cornice.
Cross-grained stuff, 221.
Cross-springers; in groins of the pointed style, the ribs that spring from one diagonal pier to the other.
Crown; the uppermost member of a cornice, including the corona, &c. Of an arch, its most elevated line or point.
Crown and other glass, 420.
Crown-post, 221.
Crypt; an antient name for the lowest part or apartment of a building.
Cube-root, extraction of, 557.
Cupola; a dome, arched roof, or turret.

F.

G.

Jamb-post; a post fixed on the side of a door, &c. and to which the jamb-lining is attached.
Jamb-stones; in walls, those used in building the sides of an aperture, and of which every alternate stone should have the whole thickness of the wall.
Jettee or Jetty, in Masonry, 338.
Jibb-doors, 183.
Joggle; the joint of two substances, as of wood, &c. so formed as to prevent their sliding past each other. See page 128.
Joggled-joints, 339.
Joggle-piece, in carpentry, 225.
Joinery, in general, 159.
Jointer. See *Tools in Joinery.*
Joists, 226.
Juffers, 226.

K.

Keep; in a castle, the middle or principal tower.
Kerf, in carpentry, 226.
Keyed-dado; dado, secured from warping by bars grooved into the back.
Keys; in naked flooring, are pieces of timber framed in, between every two joists, by mortise and tenon. If driven fast between each pair, with the ends butting against the grain of the joists, they are denominated *strutting pieces.*
Keys; in joinery, pieces of wood let, transversely, into the back of a board, especially when made of several breadths of timber, either by dove-tailing or grooving.
Key-stone, 339.
King-post, 126, 226.
Knee, 226.
Knot, 226.
Knotting; in painting, the process for preventing knots from appearing in the finish.

L.

Label; an ornament placed over a window or other aperture, generally in a castellated building, and consisting of a horizontal portion over the head, with a part at each end returning downwards at a right-angle: the latter may be terminated by a bead, but it more frequently returns again at a right-angle outwards or horizontally. See *Plates of Elevations*, VIII, IX, X, XIV.
Labyrinth; an intricate building, so contrived by its meandring form, as to render it difficult for those who have entered, to find the way out again. Hence a *Labyrinth-fret*, a fret with many turnings, which was a favourite ornament of the antients. See *Fret.*
Lacunariæ, or Lacunars; panels or coffers formed on the ceilings of apartments, and sometimes on the soffits of coronæ in the Ionic, Corinthian, and Composite, orders.
Lancet-arch; the same as *pointed arch.*
Landing of Stairs, 433, 439.
Lantern; a turret raised above the roof, with windows round the sides, constructed for lighting an apartment beneath.
Larmier or Larmer. See *Corona.*
Lath-bricks; a sort of bricks, much longer than the ordinary sort, and used for drying malt upon.
Laths and Lathing, 372, 391.
Lathing, laying, and set, 373, 391.
———, floating, and set, 373, 391.
———, plastered, set, and coloured, 391.
———, pricked up, floated, and set, for paper, 391.
Laying, in plastering, 373, 391.
Laying on trowels, 392.
Laying slates, manner of, 399.
Lead; its properties, 404; pigs of, 404; milled lead, 406; sheet lead, laying of, 407; how charged, 408.
Lead, white, 410.
Ledgers; in scaffolding for brick buildings, the horizontal pieces of timber parallel to the wall, and fastened to the *standards* by cords, for supporting the *putlogs.* On the last are laid the boards for working upon.
Lemma, definition of, 15.
Length, breadth, depth, and height, in building, 425.
Lengthening timbers, 120, 280.
Level, in masonry, 339.
Lever-boards; a set of boards, parallel to each other, so connected together that they may be turned to any angle, for the admission of more or less air or light; or so as to lap upon each other and exclude both.
Lime, 369.
Lime and Hair, 392.
Lime-wood, 262.
Lining; the covering of the interior surface of a hollow body, and used in opposition to *casing* the exterior surface.
Lining of a wall, 226.
Lining-out; drawing lines on a piece of timber, &c. so as to cut it into boards, planks, or other figures.
Linseed oil, 411.
Lintels, in carpentry, 226.
Listing; in carpentry and joinery, the act of cutting away the sap-wood from one or both edges of a board.
Litharge, 410.
Lobby; a small hall or waiting-room, or the entrance into a principal apartment.
Lodges and Entrance to a Mansion, 565, and *Elevations, plate* X.
London Bridge, 292.
Lower-rail, 226.
Luffer-boarding; a series of boards placed in an aperture, very frequently in lanterns, so as to admit air into the interior, and to exclude rain.
Lunette; an aperture in a cylindric, cylindroidic, or spherical, ceiling; the head of the aperture being also cylindric or cylindroidic.
Luthern; a kind of window, over the cornice, in the roof of a building, formed perpendicularly over the naked of the wall, for the purpose of illuminating the upper story. They are denominated according to their forms, as square, semi-circular, bull's eyes, &c.
Lying panel, 226.

M.

N.

Naked flooring, 118, 128.
Nave; the body of a church, reaching from the choir or chancel to the principal door.
Nebule; a zigzag ornament, but without angles, frequently found in the remains of Saxon architecture.
Neck of a capital; the space between the channelures and the annulets of the Grecian Doric capital. In the Roman Doric, the space between the astragal and annulet. See *Orders, plates* I, II, and III.
Nerves; the mouldings of the groined ribs of Gothic vaults.
Newel of a stair-case, 228, 439, 441.
Niche; from an Italian word, signifying a *shell;* a hollow formed in a wall, for receiving a statue, &c. 441. An *Angular niche* is one formed in the corner of a building: A *Ground Niche*, one having its rise from the ground, without a base or dado.
Niches; in carpentry, 134: in brickwork, 359.
Nogs; a provincial term, signifying what are otherwise called *Wood-bricks.*
Nogging. See *Brick-nogging.*
Nosing of a step, 438.
Notch-board, in stairs, 189.

O.

Oak timber, 257.
Obelisk; a quadrangular pyramid, high and slender, raised as a monument or ornament, and commonly charged with inscriptions and ornaments.
Octastyle, 467.
Odeum; among the antients, a place for the rehearsal of music and other particular purposes.
Off-set, 426: in masonry, 339.
Ogee; a moulding of two members, one concave, the other convex. It is otherwise called a *cymatium:* in joinery, 228.
Oil, linseed, 411: drying, 411: of turpentine, 411.
Opened-newelled stairs, 189.
Orders of Architecture, origin of, 452: proportions of, 455, 457: ornaments of, 467, 476: practice of, with illustrations, 480.
Oriel-window; a projecting angular window, commonly of a trigonal or pentagonal form, and divided by mullions and transoms into different bays and compartments.
Ornamental Masonry, 308.
———— Painting, 418.
Ornaments, casting of, 377.
Orthogonal; the same as *Rectangular.*
Orthography; an elevation, showing all the parts of a building in true proportion.
Ova; an ornament in form of an egg. *Oviculum* is its diminutive.
Ovens, construction of, 360, and *plate* LXXXVI.
Ovolo, 443, 468, 9.
Out of winding; perfectly smooth and even, or forming a true plane.
Out to out; to the extremities or utmost bounds; as in taking dimensions.

P.

Pagoda, or Pagod; an Indian temple, common in Hindoostan and the countries to the east. These structures, dedicated to idolatry, are mostly of stone, square, not very lofty, without windows, and crowned with a cupola.
Painter's tools, 416.
Painter's work, valuation of, 418.
Painting in general, 410.
Painting, the several kinds of, 417.
Palace; a name generally given to the dwellings of kings, princes, bishops, &c.
Pale; a pointed stake, and piece of board, used in making enclosures. Hence a *Paling Fence* is that sort of fence which is constructed with pales. See *Post and Paling.*
Paling for trees; a sort of fencing for separate trees, formed by three small posts, connected with cross bars.
Palisade; pales or stakes set up for an enclosure.
Pallier, or Paillier; a French term, signifying a landing place in a stair-case, which, being broader than the rest of the stairs, serves as a resting-place.
Pallification, or Piling; the act of piling ground work, or strengthening it with piles.
Panel, 228, 444.
Panels, in joinery, 160.
Pantheon; a temple of a circular form, originally pagan.
Parapet; a dwarf wall, generally raised to prevent accidents.
Parapets, 310, 339.
Parget; the several kinds of gypsum or plaster stone, of which *Plaster of Paris* is composed.
Pargeting, in plastering, 392.
Partition or Division Wall, 426.
Partitions, designs for, 155.
Party-walls, 363.
Passages, 432, 433.
Paternosters; a sort of ornament in form of beads, round or oval, on astragals, &c.
Pavements, 435.
Pavilion; a kind of turret or building, usually insulated and contained under a single roof; sometimes square, and sometimes in the form of a dome: thus called from the resemblance of its roof to a tent.
Paving, 339.
Pedestal; a square body of stone or other material, raised to sustain a column, statue, &c. It is, therefore, the base or lowest part of an order of columns. A *Square Pedestal* is that of which the height and width are equal: a *Double Pedestal*, that which supports two columns, and therefore is greater in width than height: a *Continued Pedestal* is that which supports a row of columns, without any break.
Pediment; an ornament, properly of a low triangular figure, crowning the front of a building, and serving often also as a decoration over doors, windows, and niches. Though the original and natural form of the pediment be triangular, it is sometimes

Powderings; a species of device for filling up vacant spaces in carved works, &c.
Prick-posts, 229.
Pricking-up, 373, 392.
Priming; in painting, the laying on of the first colour.
Principal Brace; a brace immediately under the chief rafters or parallel to them. See *Brace*.
Principal Rafters. See *Rafters*.
Priory; a religious house or institution, at the head of which is a prior or prioress.
Prison and County Court House, design and plan for, 575. *Elevation, plate* XL, &c.
Prison, design for a small county prison, 577. *Elevation, plate* XLI, &c.
Problem, definition of, 15.
Problems, 62, 75, 77.
Profile; the figure or draught of a building, &c.; also the general contour or outline.
Projection or Break, 441.
Projection, treatise on, 539: definitions, &c. 540: problems, 541.
Projections, 466.
Projecture; the outjetting, or prominence, which the mouldings and other ornaments have beyond the naked of the wall, &c.
Pronaos; an antient name for a porch to a temple or other spacious building.
Proscenium; in a theatre, the stage, or the front of it.
Prostyle; a range of columns in front of a temple.
Prothyrum; a porch or portal at the outer door.
Protractor, 559.
Pudlaies, 229.
Pugging, in bricklaying, 392.
Pug-piling; dove-tailed or pile planking.
Pumps, leaden, 408.
Punchions, in carpentry, 229.
Purfled; ornamented in a manner resembling drapery, embroidery, or lace-work.
Purlins, 128, 229.
———, in circular roofs, 152.
Putlogs or Putlocks; in scaffolding, the transverse pieces, at right angles to the wall. See *Ledgers*.
Push of an arch. See *Drift*.
Putty, plasterer's, 392: glazier's, 420.
Puzzolana; a substance composed of volcanic ashes, named from *Puzzuolo*, in Italy, where it abounds, and celebrated as a principal ingredient in cements. When mixed with a small proportion of lime it quickly hardens, and this induration takes place even under water. See *Cements*.
Pycnostyle, 466.
Pyramid; a solid massive structure, which, from a square, triangular, or other, base, rises diminishing to a vertex or point.

Q.

Quadra; any square border or frame encompassing a basso relievo, panel, &c.
Quadrangle; a figure having four sides and four angles: a square is, therefore, a regular quadrangle, and a trapezium an irregular one.
Quadrefoil Arch, 565, and *Elevations, &c., plate* X.
Quarry, 339.
Quarry also means a pane of glass, in a lozenge or diamond form.
Quarter-round, 161.
Quartering, 229.
Quarters, 229.
Quarter-spaces, in stairs, 440.
Queen-posts, 127.
Quink; a piece of ground taken out of any regular ground-plot or floor. Thus, if the ground-plot were oblong or square, a corner-piece separated from it, to make a court, yard, &c. is called a *quink*.
Quirk, in joinery, &c., 160, 161, 472: Quirked ovolo, 162. See *Ovolo*.
Quirk-mouldings are the convex parts of Grecian mouldings, where they recede at the top, and form a re-entiant angle with the soffit which covers the moulding.
Quoin, external or internal, 426, 429. The name is particularly applied to the stones at the corners of brick buildings. When these stand out beyond the brick-work, with edges chamfered, they are called *Rustic Quoins*.

R.

Rabetting. See *Rebating*.
Rafters, 229.
———, principal, 125.
———, common, 128.
Rails, in joinery, 229.
Raiser; a board set on edge under the foreside of a step or stair.
Raising-pieces; pieces that lie under the beams and over the posts or punchions.
Raising-plates or Top-plates, 229.
Raking moulding; a moulding whose arrises are inclined to the horizon in any given angle, 173, 174.
Ramp; in hand-railing, a concavity on the upper side, formed over risers, or over a half or quarter space, by a sudden rise of the steps above.
Rampant arch; an arch, of which the abutments spring from an inclined plane.
Random courses, in paving, 339.
Rank-set, 229.
Rates of Houses, 368, and *Elevations, plates* I. to V.
Rebating, in joinery, 159.
Recess, 441: of windows, 435.
Reed; Reeded; 161.
Reglet, or Riglet; a flat narrow moulding, used chiefly in compartments and panels to separate the parts or members, and to form knots, frets, &c.
Regrating; in masonry, taking off the outer surface of an old hewn stone, so as to make it look new again.
Rejointing; in masonry, the filling up of the joints of stones in old buildings, when worn hollow by time and weather.
Relievo, Relief, or Embossment. See *Alto-relievo*, &c.
Rendered and set, in plastering, 374, 393.

S.

T.

ERRATA.

Page 203, line 3 from the bottom, for LXIV. insert LVIII.
—— 213, line 3, in some copies, for LXIV. insert LVIII.
—— 243, last line but one should read, "trying-plane, long-plane, jointer-plane, and smoothing-plane, but not in," &c.
—— 244, line 5, erase the words, '*on the fore-end of the stock, or.*'
—— 534, line 4, add, *Fig.* 1, *pl.* V.
Windows, Pl. V, should be erased from page 575, near the bottom, having been inserted by mistake.

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DIRECTIONS TO THE BINDER FOR PLACING THE PLATES.

*** As the same plate is frequently referred to from *different* pages, and as, occasionally, several Plates are placed, in succession, against the same page, thereby rendering the references inconvenient; we recommend to the Reader to have the Plates arranged as under, and bound together either in a *separate* volume, or altogether at the end of the letter-press, so as to form one volume: but, if this mode be not preferred, they may be placed opposite to the respective pages, as follow:

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FOURTH SERIES.—PLANS AND ELEVATIONS.

Total Number of Plates, 184.

FRONTISPIECE TO THE PRACTICAL BUILDER'S PRICE BOOK.

DESIGN FOR A CASTELLATED VILLA.

a Design by R. Elsam Arch[t]

Engraved on Steel by A. Jack

London, Published by Tho[s] Kelly 17 Paternoster Row April 30 1825

THE

PRACTICAL BUILDER'S

PERPETUAL PRICE-BOOK;

ELUCIDATING

THE PRINCIPLES OF CORRECTLY ASCERTAINING THE AVERAGE VALUE OF THE DIFFERENT ARTIFICER'S WORKS USUALLY EMPLOYED IN BUILDING;

WITH THE

Customs of Measuring and Valueing

IN THE VARIOUS PARTS OF THE UNITED KINGDOM,

&c. &c. &c.

CONTENTS OF THE BUILDER'S PRICE-BOOK.

CONTENTS OF THE PRICE-BOOK.

☞ *The Binder is requested to place this* List of Contents *opposite* Chapter I. *of the* "Price-Book;" *and the additional Plates according to the arrangement in page* 160.

THE

PRACTICAL BUILDER'S

PERPETUAL PRICE-BOOK.

CHAPTER I.

I.—Cursory Observations on the different Customs of Measuring Carpenters' and Joiners' Works, &c.

The customs of measuring and valuing roofs, by the square, including tye-beams, king-posts, rafters, braces, struts, purlins, &c., are certainly erroneous; inasmuch as measurers or valuators must be frequently, if not always, left entirely in a state of uncertainty after the buildings are finished, as to the actual scantlings of the several timbers with which the roofs are composed; of course, destitute of satisfactory information as to the exact quantities of timber consumed in the number of squares; for, unless minute calculations are made, previous to the timbers being concealed, it is clear that the system must be altogether erroneous, or at any rate very defective. Provincial customs.

The only true and satisfactory method of valuing roofing, of every description, is, to measure each piece of timber, of whatever denomination, before it is concealed; in order that the measurer may certify as to the valuation and quantities of what he has *actually seen.* Having so done, the next step to be taken, should be to ascertain the cubical quantities of the respective scantlings, then to class them according to their relative degrees of workmanship, into an abstract, and thence to a bill, so that each item may be estimated proportionately to the value of the labour, including the prime cost of the timber, with profit, waste, sawing, land-carriage, freightage, &c. Correct methods of measuring.

The custom, also, of measuring the timbers in floors and quarter partitions, in the manner above described, is equally incorrect, fraught with the same danger, and should be discouraged by all professional men. Floors.

So soon as the carcase or shell of a building is covered in, that is, antecedent to the boarded floors being laid, or the ceilings lathed and plastered, all the timbers should be measured, previous to their concealment, in order that doubts may not be subsequently entertained, as to the actual quantities introduced: and, if this system was universal, it would afford general satisfaction, and prevent many unpleasant disputes. Time of measuring.

Cubical contents of bond, &c.

Bond-timber, wall-plates, lintels, and discharging pieces, should be also measured, and paid for according to their cubical quantities, as work of the same denomination, and not by running feet, reduced to uncertain standards.

Doors, &c. by the foot super.

GATES, DOORS, WINDOW-SHUTTERS, JAMB-LININGS, SOFFITS, &c., should be measured by the foot superficial, and valued in proportion to their various degrees of workmanship; and, where doubts exist, as to their intrinsic value, exact details of the component parts should be taken, in order that suitable prices may be ascertained.

Bad customs of valuing stairs;

STAIRCASES should, also, be accurately measured, as well as every other description of work, and not charged at random, by the piece; for it is impossible for any man, however great his penetration or judgement may be, to fix a just value upon a piece of work, the true contents of which he is not completely master of: yet this is frequently practised by measurers, in remote parts of the kingdom, where works of considerable magnitude are frequently carried into execution.

also sashes and frames.

CIRCULAR-HEADED SASH-FRAMES, as well as others, should be measured by the foot superficial, and paid for agreeably to their exact sizes, and not according to vague or capricious opinions of their supposed value.

SASHES should, also, be measured by the foot superficial; but, when the sashes are hung or fixed complete, it is, by far, the best way to measure the sashes and frames together, including all the appurtenances.

We shall, for the present, conclude our remarks on those customs which, in our opinion, ought to be abolished; and proceed to point out some general rules, which, if attended to, will soon become familiar to persons who are conversant with Mensuration.

How to measure boarded floors;

IN MEASURING BOARDED FLOORINGS the dimensions should be taken to the extreme parts; to which must be added, the quantities contained in the windows, door-ways, recesses, &c. Having computed the quantities in squares, then take your deductions for chimnies, staircases, &c., and the exact quantities will be ascertained; for the true value of which, calculations should be made with references to the prices of deals at the time the works are executed. Having found the quantities of boards necessary to perform a square, with the time requisite to lay the same, including nails, and a fair profit, prices for every description of boarded floorings may be found with the utmost ease. And for the value of every other denomination of carpenters' and joiners' work, similar pains must be taken, and the results will be the same.

also external boardings.

WEATHER-BOARDINGS should be measured in the same manner as other boardings, out of which deductions for doors, windows, and all other openings, must be taken, then valued by the square, containing one hundred superficial feet.

To measure partitions.

BOARDED PARTITIONS should be measured in the same manner, and the several doors and windows contained therein, deducted, unless agreed to be included.

How to measure windows.

WINDOWS should be measured by the foot superficial, including sashes, and the dimensions, taken in feet and inches, from the under-side of the sills to the upper-sides of the top-rails, for the heights; and, for the breadths, from outside to outside of the jambs; and the products of them will be the superficial contents, the value of which, per foot, may be ascertained by detailed measurements of the component parts, contained in a sash-frame, including the beads, casings, sill,

sashes, weights, lines, pullies, &c.: having found, by these means, the value of a window, one foot superficial of that window will stamp a value upon all other windows of the same denomination. The value of sash-frames, exclusive of the sashes, weights, lines, pullies, and hanging, may be also found in the same manner, so that definitive prices may be fixed for windows, of all sizes and descriptions. Sash-frames.

STAIRCASES should also be measured by the foot superficial, and the dimensions taken with a string girt over the risers and treads; those lengths or girts, multiplied by the lengths of the steps, will produce the superficial contents; for the exact prices of which calculations should be made, including the steps, risers, and carriages, unless the latter are measured with the carcases of the buildings at the time before-mentioned, which, to prevent any doubts as to the real scantlings, is the best and most satisfactory way, and therefore recommended. To measure stair-cases,

MAHOGANY and DEAL MOULDED HAND-RAILS should be measured by the foot running, and valued according to their sizes, goodness, and neatness of workmanship: the ramped or circular parts should be taken separately. The architraves, or moulded string-boards, should be measured by the foot superficial; the strait, ramped, and circular parts, each by itself, and estimated accordingly. The brackets, at the end of the steps, should also be valued in proportion to their sizes and ingenuity of workmanship, at per piece. hand-rails, &c.

DOOR-CASES, that is to say, JAMB-LININGS, SOFFITS, &c., should be measured by the foot superficial, and the dimensions taken with a string, girt over all the mouldings: the two sides and the soffits, for the lengths, and the thickness of the walls, or the partitions, for the widths; which, multiplied together, will produce the superficial contents. For the defined value of which, detailed measurements of the rails, panels, mouldings, &c. should be taken, to find the value of one foot, which will serve to regulate the prices of every description of work which may approximate in quality thereto. How to measure linings, &c.

FRAMED-DOOR GROUNDS should be measured by the foot superficial; but all narrow grounds by the foot, running measure.

SINGLE and DOUBLE-FACED ARCHITRAVES should also be measured by the foot running, and valued according to their widths, sinkings, or number of mouldings worked thereon. Architraves.

TWO, FOUR, SIX, or EIGHT PANELLED DOORS, as well as all others, including GATES, &c., should be measured by the foot superficial, the value of which may be ascertained by dissecting one of each denomination, so as to discover an equitable ratio, due regard being paid to the prime cost of the unmanufactured article, including a reasonable price for the workmanship, glue, nails, screws, &c. The same must, also, be observed with respect to WINDOW-SHUTTERS, BACK FLAPS, LININGS, BACKS and ELBOWS, SOFFITS, and every other description of finishings appertaining thereto. Doors, gates, &c.

PLAIN, DENTIL, MODILLION, and COVED CORNICES, should be measured by the foot superficial, and their dimensions, in respect to the breadths, taken with a string-girt, into the mouldings; and those dimensions, multiplied by the lengths, will be the superficial contents, the prices of which must be governed by the qualities of the mouldings, their neatness, goodness, and delicacy of workmanship. Cornices.

How to measure wainscoting

FRAMED WAINSCOTING, that is, thin deal partitions, should be measured by the yard square, containing nine superficial feet; and the dimensions taken in feet and inches, thus girting down every moulding with a string, contained between the floors and the ceilings, for the heights, and the circumferences of the rooms for the lengths, deducting the doors, windows, and chimnies. The seats of windows, if any, cheeks, soffits, linings, &c. should all be taken by themselves; the prices of which can only be ascertained by detailed measurements of one or more superficial yards or square feet, embracing the tops, bottoms, and upright rails, or as the designs of the paneling may happen to be.

Columns.

DEAL GLUED COLUMNS should be measured by the foot superficial; the average girts being taken for the widths by their altitudes, and valued as circular works, according to their thicknesses; the flutings, if any, by the foot, running measure; the bases and capitals, at per piece, as circular moulded work.

Outside frontispieces.

FRONTISPIECES should be measured and valued by the foot superficial, and every part taken separately: *viz.* the cornices, friezes, architraves, pilasters, shutters, bases, and capitals; which, priced according to details of their value, the sums total will be their correct amounts.

Mouldings.

PLAIN TORUS, and all sorts of MOULDED SKIRTINGS, as likewise SURBASES of every description, may be measured by the foot, super or running measure, as well as COMMON OR QUIRK OGEES, COMMON and QUIRK OVOLOS, CAVETTO MOULDINGS, CYMA RECTAS, and FANCY MOULDINGS, &c., and their prices ascertained according to their girts, degrees, and goodness of workmanship.

Mortises and tenons.

In reference to the ROUGH CARPENTRY, it is necessary to observe that, wherever mortises and tenons are made, the pieces of timber should be measured from the ends of the tenons; and, likewise, that the ends of the joists, in the different floors, which are inserted in the walls, must be added to their respective lengths, as well as all manner of laps in bond timber and wall-plates.

General observations upon measuring the principals in roofs.

It is likewise proper to remark, that the several timbers in framed roofs and partitions should be measured and classed with framed flooring, and works of a similar description; taking, at the same time, into consideration, that, in measuring king and queen-posts, where there is a necessity for cutting out parallel pieces from their sides, in order that the ends of the braces may have what are called *square butments*, the following observations should be attended to: that is, first, to measure the workmanship of such pieces or posts, by taking their depths and breadths in the widest parts; then to multiply the same together, and the product by the lengths, the cubical contents of which will produce the quantities for labour only. The next step will be to find the quantities of materials, supposing the pieces sawn out are two and a half inches thick or more; in which case they ought to be esteemed pieces of timber fit for use; and, when two feet six inches long, their lengths should not be esteemed so long by five or six inches, because the saw cannot enter the wood with much less waste; and, from the reasons before described, the pieces so cut out ought to be deducted from the cubical contents ascertained for the workmanship, and the residue allowed for the quantities of materials; but, if the pieces cut out should be less than two and a half inches square, and two feet six inches long, then the entire pieces should be measured as solid, for the materials, as well as for the labour; and because the pieces so cut out would not be worth taking into account.

It would be an endless task to enumerate all the various methods of measuring every description of carpentry and joinery; a complex work, upon such a plan, would presently render this into an expensive volume. It may be sufficient to remark, that some of the leading articles on Carpentry and Joinery have been adequately explained; and, from the results, any man, of common intelligence, may collect satisfactory information. But we take for granted that he possesses a sufficient knowledge of Geometry to ascertain the quantities of all manner of superficies and solids; and is thus enabled to measure and value without the fear of shame or reproach. Concluding remarks on carpentry.

The most common instruments for taking the measures, are Five and Ten feet Rods, divided into feet and quarters of feet: and two and three feet rules, divided into inches, or twelfth parts and each twelfth part into eight others; the fractional parts beyond these divisions need not be taken any account of, unless the works to be measured are of an extremely valuable nature. Instruments to measure.

When the dimensions are taken, in the manner described, the best method of squaring the dimensions is by duodecimals, commonly called Cross Multiplication.* Squaring contents.

II.—Introductory Explanation of the Tables on Carpenters' and Joiners' Works.

When the prime cost of ten-feet three-inch deals or planks, with timber, are charged by the merchants at any of the following prices, in the prime cost columns, the succeeding Tables will point out what master-builders may charge in their day-bills, which, with reference at any time to the existing or current prices of timber and deals will also govern the leading prices in their measured bills. Under these circumstances, it is conceived that, as far as relates to Carpentry and Joinery, this volume may be considered as a *Perpetual Price-Book;* which, being properly understood, it is presumed, will not only prove to be useful to architects, surveyors, measurers, and tradesmen, but also to such persons who may be desirous of attaining a thorough knowledge of the leading principles of measuring and valuing every description of work appertaining to the building profession. And, for the satisfaction of those who have not always time to devote to the minutiæ of valuations, it has been deemed necessary to be as explicit as possible in stating, upon general principles, in what manner the prices have been ascertained. It must not, however, from hence be expected that details can be given in every instance, the object of the work is to impart general information; and, to effect the purpose intended, no pains whatever have been spared. General remarks on the tables.

The succeeding Tables, from No. 1 to No. 14, having been arranged for the purpose of elucidating the principles of valuing Carpenters' and Joiners' works, we shall now explain them in the most concise manner; and as the Tables Nos. 7 and 10, have been selected to illustrate the basis upon which the following prices of Carpentry and Joinery have been constructed, it will render Tables, Nos. 7 and 10, &c.

* Vide Elsam's "*Gentleman's and Builder's Assistant*," published in 1808; also Kelly's "*Practical Builder*," page 554, published in 1825.

Tables, Nos. 7 and 10.

the subject more familiar by confining ourselves to the explanation of those Tables, which are similar to the rest, as regards the leading system of valuation; and as the prime cost of timber and deals in the two Tables adverted to exhibit those prices which are likely to remain steady, not only in the metropolis, but in every part of the kingdom, we have been induced to fix on the Tables referred to, as being the most likely to suit the views of those who have occasion to refer to works of this description. At the same time, it is necessary to remark, that we are aware of the continual variation in the prices of timber and deals, and for that purpose have constructed a series of Tables to answer to the rise and fall thereof; which, on being consulted, will enable the valuator to add to, or deduct from, the prices, as occasion may require.

Variation of prices.

Construction of Tables, Nos. and 10, &c.

In reference to the Tables, Nos. 7 and 10, each of which, with the rest, consists of five vertical columns and eight horizontal rows, it will be seen that the subsequent prices are founded on the prime cost of timber, when at £6. 13*s.* 4*d.* per load; and ten-feet three-inch deals, when at £39. per hundred. Now, as it is well known that ten-feet three-inch deals are nine inches wide, it will readily occur that, in each hundred of deals, of the lengths, breadths, and thicknesses, before described, there are 4½ loads of timber, as may be seen by the following calculation:

Cubical contents of 120 10-feet 3-inch deals.

	ft.	*in.*		
	10	0 long.		
		9 wide.		
		3 thick.		
	7	6	0	
			3	
	1 10	6	0	
				10
	18	9	0	0
				12
Contents..	225	0	0	0 { Equal to 4½ loads of fir timber, containing each 50 cubic feet.

Elucidation of Tables, Nos. 7 and 10.

Hence, it appears, there are 225 cubic feet in each long hundred of ten-feet three-inch deals; and as fir timber and deals are articles of the same species, we are desirous, for the purpose of being consistent, that their ratios of prices should be relevant; and under these impressions the subsequent Tables have been made, which will develope the natural course which should be pursued in tracing the primitive value of the raw article before it is converted. It is true, that timber and deals are never at the same price, when reckoned at per foot cube, but they are alternately used for the same purposes, and are of relative qualities and prices; and, as it would be impossible to analyze the quality of deals when promiscuously used in buildings, it is necessary, for the sake of being consistent, to amalgamate, or generalize, the original value of these two articles of the same quality, in order to produce consistent prime-cost average

Average prices of timber and deals.

tables, without which it would be impossible, in the adjustment of prices, conscientiously to discharge that duty which the importance of the subject imperatively requires. And, for this purpose, we have selected the current value of ten-feet three-inch deals, when at £39. per hundred, as an intermediate scale, which, with reference to the Tables 7 and 10, will embrace, as far as the nature of a price-book will admit, the average value of Memel, Dantzic, Riga, and American timber, at £6. 13*s.* 4*d.* per load, or as per the different sorts of deals, at £8. 13*s.* 4*d.*, elucidated in Table, No. 10.

Timber and deals analyzed.

Now, in order to analyze the presumed current value of ten-feet three-inch deals with the relative standard value of fir timber, being of the same species of wood, it will be necessary to prove the result by the subsequent operation. We shall, therefore, demonstrate the proposition by stating, that if 225, the number of cubical feet contained in 120, ten-feet three-inch deals cost £30., what will 50 cubic feet of fir timber, the quantity in a load, cost after the same ratio.

Value of fir timber per load, in reference to deals.

feet.	*£.*	*feet.*
225 :	30 ::	50
	20	
	600	
	12	
	7200	
	50	

225) 360000 (1600
225   133 4
1350   6 13 4 *Ans.* per load.
1350
....00

And this will be about the general average price of timber.

Relative value of timber and deals.

By the above, it appears that when ten-feet three-inch deals are at £30. per hundred, timber should be £6. 13*s.* 4*d.* per load, to bear the same ratios of prices; but this is not the case. Timber and deals are the same species of wood; but their relative value in the timber-market does not correspond; the difference in the average value, by cubical measure, is one-third more, as may be seen by reference to Tables, Nos. 7 and 10.

Progressive value of fir timber.

The present standard, or average price, of foreign fir timber being ascertained by Table, No. 7, in the manner described, the next step will be to prove what additions should be made to the prime cost of £6. 13*s.* 4*d.* In the first place, we must add, at least, three-pence per foot cube for sawing; one penny per foot cube for carriage, the distance of one mile; and, at the same time, make an allowance of six feet for waste, in sawing, &c. These prices, added together, will produce the prime cost, without any profit, to the former of which the latter must be added, as per example.

Calculation of fir timber, and how to charge the same.

	£.	s.	d.
Prime cost of 50 cubic feet of timber, as per calculation, which is after the rate of 2*s.* 8*d.* per foot cube	6	13	4
Average value of sawing, after the rate of 3*d.* per foot cube	0	12	6
Average price of carriage, one mile, after the rate of 1*d.* per foot cube	0	4	2
Allowance of six feet for waste, in sawing, &c. at 2*s.* 8*d.* per foot cube	0	16	0
	£.8	6	0
Twenty per cent. profit, which is the usual allowance	1	13	2
	£.9	19	2

Timber estimated at £10. per load.

By the above calculation it appears that £9. 19*s.* 2*d.* is the full value per load for fir timber, in Table, No. 7, including every charge that can be made; but as this sum approximates so near to the sum of ten pounds per load, we shall, to avoid fractions, estimate the timber at ten pounds, which will be after the rate of four shillings per foot cube, to be charged in day-bills; and also for fir, without any labour, which will regulate all the leading articles under the denomination of rough carpenters' works, in their measured bills.

Explanation of Table, No. 10; deals £39. per hundred.

Having fully explained the presumed or adopted standard scale, for the valuation of fir timber, by Table, No. 7, we shall now proceed to explain the Table, No. 10, as regards the prime cost of ten-feet three-inch deals, *which* regulates the subsequent prices of Joinery; the first column of which exhibits the prime cost of a ten-feet three-inch deal, at six shillings and sixpence, which is after the rate of £39. per hundred: the same column also exhibits $2\frac{1}{2}$-in., 2-in., $1\frac{1}{2}$-in., $1\frac{1}{4}$-in., 1-in., $\frac{3}{4}$-in., and $\frac{1}{2}$-in., deals after the same ratios.

Second column of Table.

The second column shows the same article in progress of valuation, with the prices of sawing and land-carriage, the exact ratios upon which are defined under Sawyer's prices, accompanied by an explanatory engraving.

Third column of ditto.

The third column, in like manner, also shows the value of the preceding deal, with the addition of 25 per cent., which includes the profit, and, also, the presumed loss for waste, which is estimated at 5 per cent., leaving the net profit 20 per cent.

Fourth column of ditto.

The fourth column also describes the value of the same, at per foot running measure.

Fifth column of ditto.

And the fifth and last column, the value reduced to the foot superficial.

Value of materials and labour.

By the assistance of which Table, and the residue, persons who are competent to affix the *value* for the labour to the value of the materials, may proceed, *ad infinitum*, to measure and value the works alluded to without being guilty of the least inconsistency. But, as the value of labour cannot be ascertained by the quantities and qualities of the materials which may be converted, it will be requisite that we should discuss this point, with reference to the mutual and equitable interests of the employer and employed. Taking, then, into consideration the average value of labour in every part of the United Kingdom; at the first view it may appear somewhat inconsistent to suppose, that average prices for labour could be constructed upon the principles of equity; but, to those whose practice

has been extensive, the proposed plan will neither present itself as inconsistent nor irreconcileable. In reference to the local wages of artisans, but more especially to those of Carpenters and Joiners, we find the difference very considerable in various parts; consequently it will be inferred, that the prices for workmanship, when measured, should be regulated by the local prices of labour, as well as the current prices of timber and deals, which is generally the case. The system, therefore, of valuation in every part of the kingdom may be considered the same, except as relates to certain local customs in measuring; and these points being clearly understood, the next step to be taken will be to show upon what principle average prices, including labour and materials, can be considered consistent. It is true the current prices for wages differ very materially in different places; but the value of foreign timber and deals are nearly the same in every sea-port throughout Great Britain and Ireland, the value of which, when converted, entirely depends upon where the work is to be performed; and as it is necessary to transport these materials into the interior or midland counties, which is very frequently the case, the expense of extra freightage, land-carriage, and other incidental costs, will be found equal to, if not more, than the difference in the price of wages from those given in London. Under these circumstances, we are of opinion that the prices of Carpenters' and Joiners' work contained in this work, may be generally adopted; but where it is required, from the importance of the subject, to analyze the exact value by references to the current prices of wages, as well as the qualities of workmanship and time, the principles herein laid down, it is presumed, will teach those who are disposed to investigate, in what manner they should proceed to find the value of the work in question, in any part of the United Kingdom.

Local wages.

The system of valuation the same.

Current prices of wages.

General principle of valuation the same.

The prime cost of materials and labour, including land-carriage, freightage, and all manner of incidental expenses, is the *intrinsic* value of every sort of work; to which should be added, fair and rational profits, with references to what are usually allowed where the works are executed. And in order to find the value of labour, it will be requisite to ascertain what number of workmen, of moderate abilities, can execute given portions within given times, the value of which, reduced to solid or superficial feet, and added to the value of the prime cost, will, in the manner before described, produce correct prices. Any person, therefore, of moderate talent, who will take the pains to proceed in the manner herein-mentioned, with reference to the works being performed in town or country, may ascertain the exact value of every description of work, without trusting to vague and indefinite opinions.

Intrinsic value of work.

Persons of moderate talent may value.

It has been contended, by many ingenious calculators, that the value of labour cannot be ascertained by any precise rules; and that it is not in the power of any human being to calculate, with any degree of certainty, upon the *quantum* of work which can be performed, by different men, in the same spaces of time.

Value of labour.

It would be impossible to controvert this doctrine upon any arithmetical principle, or to lay down any given rule for the valuation of manual labour; but as experience teaches wisdom, man by degrees, in proportion to his intellect, acquires knowledge, without the aid of any prescribed rules; and thus it is that we see persons, without education, performing wonders to the astonishment of their fellow-creatures. And, under these considerations, it is argued that the

Manual labour.

talent, genius, and comprehensive faculties, of the human race, cannot be reduced to any standard; and that, consequently, the system of valuing labour by admeasurement, must be erroneous. And, if we were not perfectly satisfied, by experience, that the average worth of men's labour could not be ascertained but by attentive observation, we might be inclined to subscribe to the opinions promulgated, without presuming to incorporate the average of talent, for the conveniency of commercial pursuit; but as it does appear that no other general principle can be adopted, it would be only a waste of time to speculate upon other systems; and, after all, it must be allowed that the difficulty of finding the value of labour is very great, this knowledge can only be acquired by those who will take the trouble to average the value of labour, by taking an account of the average of men's time in the execution of different works which are similar.

General principles to value labour.

The most competent valuators.

Under these circumstances, it must be observed, that those who have not comprehensive ideas of the average value of labour, cannot be accomplished valuators; but as it is well known to those who are acquainted with the most respectable architects, surveyors, and measurers, that most of them, especially in the metropolis, are men of considerable intelligence, we cannot better discharge our duty than by recommending such scientific persons to settle and determine all matters in dispute, as regards the value of intricate workmanship, including the materials.

Standards to appreciate labour.

Now it would appear, by the preceding arguments, that some men are considered more expert with the mallet and chisel than others. This being the case, no doubt can be entertained of their relative earnings; but as it would be utterly impossible to make a scale or standard, by which the value of labour could be appreciated, with reference to men's abilities, we must be content to take the average price of general talent, as laid down by men of experience; previously taking into consideration, (with due deference to the circulating medium of current prices,) the necessity of making such calculations as the exigency of the cases may require. For instance, if an architect by his designs should require a piece of work to be performed according to a fancy design, without making any previous bargain for the price, it is highly probable that the value might become a question of serious consideration, after the work was complete. Taking these circumstances into consideration, master-tradesmen should be extremely circumspect in keeping exact accounts of their men's time, and likewise of all the materials, that when the measurers, or valuators, are called upon to discharge their duties, they may be furnished with such documents, that the prices per foot cube, or superficial, for the labour as well as the materials, may be honestly ascertained. And if this practice was generally adopted by master or other tradesmen, it would afford universal satisfaction, as by references to the prime cost of the labour and materials, the exact value of each description of work might, in all cases, be justly ascertained, and the customary profits allowed.

Average value of men's time.

Examples to ascertain the value of labour.

Practices to be adopted.

Accurate accounts of prime cost.

It requires great attention to keep accurate accounts of the prime cost of each sort of work; but when the plans of buildings are complicated, and the several works are required to be done in the best manner, too much pains cannot be taken in keeping detailed accounts of the time consumed in executing each description of work; that, when measured, fair and equitable prices may be claimed for the value of the labour, as well as the materials. Under these considerations, it is manifest that general and satisfactory rules may, in most, if not in all, cases

be created for the purpose of finding the exact value of labour, in reference to the situation, as well as to the difficulty and ingenuity of the workmanship, the prices for which must invariably depend upon a series of unforeseen circumstances, which should be candidly explained at the time the work is about to be measured.

Ingenuity of works.

In contemplating the value of labour, we have embraced the most liberal view of the tradesman's interest, which has been done from a conviction that great losses are sustained, by a considerable waste of time, which cannot always be satisfactorily accounted for.

The most liberal views.

In proceeding, therefore, to affix our prices for labour, we shall adopt one general system, which will be by calculating the average quantities of labour that can be performed within given periods, by men of moderate abilities, taking the average of talent according to the following example. And to elucidate the foregoing principle of estimation, let us suppose that three two-deal six-panel square doors are required to be made by three men, who are not equally expert, but who are to be paid after the rate of five shillings per day; the doors each to be seven feet high and three feet wide; the first man performing his work in $1\frac{1}{4}$ day, the second $1\frac{1}{2}$ day, and the third $1\frac{3}{4}$ day. The average value for the labour is required per foot superficial.

Example to ascertain value of doors, &c.

First man's time is.......... $1\frac{1}{4}$
Second ditto............... $1\frac{1}{2}$
Third ditto................ $1\frac{3}{4}$

$4\frac{1}{2}$ days at *5s.* .... £1. *2s.* *6d.*

3) 7 0 height of the doors.
3 0 width of ditto.

21 0
3 doors.

63 0 total in the three doors.

feet.		*£.*	*s.*	*d.*		*foot.*
63	:	1	2	6	::	1

20

22
12

63) 270 ($4\frac{1}{4}$*d.*—*Value of labour per foot.*
252

18
4

63) 72 ($\frac{1}{4}$
63

9

Ans. $4\frac{1}{4}$*d.* per foot.

The principle of finding the value of Joinery.

How to value the materials in Joinery.

By the preceding example, it is presumed the principle of finding the average price of labour will be perfectly understood. The next step to be taken will be to find out the quantity of materials contained in one of the said doors, in order that the value thereof per foot superficial may be added to the value of the labour, so that by these means the average value, or price per foot, may be identified and traced, as generating out of the average prime cost, for labour as well as for the materials. This example being clearly comprehended, will presently unfold the system that should be adopted to find out the exact value of other works. Without further preface, therefore, let us proceed to find out the exact quantity of the materials in a two-inch deal six-panel square-door, seven feet high and three feet wide, made in the usual manner; that is, with two outside marginal rails, a middle rail, and two horizontal rails, 4½ inches wide; together with a bottom-rail, and a frieze, or lock-rail, each 9 inches wide, and the six pannels filled in with ¾-inch deal. By calculation, it appears, there are 25 feet in running measure, of 2-inch deal railing, 4½-inches wide, and 5 feet 2 inches, of like measure, 9 inches wide; the superficial contents of which are 13 feet 3 inches, as near as possible. It appears, also, there are 11 feet 7 inches super of ¾-inch deal paneling. Now, for example, by reference to the Table No. 7, but which does not regulate the subsequent prices of Joiners' work, we find that 2-inch deal is 7*d.* per foot super, and ¾-inch deal 3*d.* per foot super.

Value of similar works.

How to value a deal door, &c.

The bill, therefore, will stand thus:—

Materials in the same.

	s.	*d.*
13 ft. 3 in. super, of 2-inch deal, at 7*d.* per foot........	7	8¾
11 ft. 7 in. super, of ¾-inch deal, at 3*d.* per foot........	2	10¾
	10	7½

Elucidation of preceding example.

Ten shillings and seven-pence halfpenny, therefore, is the exact value of the materials, which includes 20 per cent. nett profit; to which sum must be added, the prime cost of the average labour, with a reasonable profit thereon. From hence it is clear, that the intrinsic value of a 2-inch deal six-panel door, 7 feet high and 3 feet wide, when 10 feet 3-inch deals are at £30. per hundred, is worth no more than 19*s.* 4½*d.* For the proof of which, examine the preceding calculations and the subsequent bill.

Value of the labour and materials in the same.

	s.	*d.*
21 feet super, for the value of the materials, as per the preceding bill, at 6*d.* per foot, nearly..............	10	7½
21 feet super, at 5*d.* per foot for the average price of the labour, which also includes a reasonable profit on the same	8	9
	19	4½

To find the value, therefore, of 2-inch deal six-panel doors, at per foot superficial, according to the prime cost value of the labour and materials, including 20 per cent. profit thereon. We must state the question in the usual way, *viz.* Further elucidation.

feet.		*s.*	*d.*		*foot.*
21	:	19	$4\frac{1}{2}$	::	1

Ans. 11*d.*

Eleven-pence per foot superficial is found to be the intrinsic value; to which may be added *one penny* per foot in addition for waste, and *one penny* per foot for hanging and other incidental expenses. One shilling and a penny per foot super may, therefore, be considered the fair average value. A Price-Book, unless it gives clear and satisfactory evidence of the manner in which the prices are found, only serves to puzzle and confound the ignorant, and to deceive the unwary. We have, therefore, endeavoured to remove the general complaint, and trust that our endeavours will be crowned with success. And having so far discharged our duty with fidelity, in elucidating some of the leading principles of finding the exact value of Joinery, we shall proceed, step by step, to make up our price-lists, in reference to the Tables, Nos. 7 and 10, when the prime cost of 10-feet 3-inch deals are at £39. per hundred; and timber at £6. 13*s.* 4*d.* per load. Fair average value of Joinery. Price-book calculated to puzzle if not explained.

The following calculations will show the manner in which the prices of fir-timber have been found at per foot cube, when the prime costs are at any of the subsequent amounts, as may be identified in the succeeding Deal and Timber Tables, commencing at No. 1, and ending at No. 14. Prices for timber explained.

EXAMPLE *in reference to* TABLE *No.* 1.

Progressive value of timber.

	£.	s.	d.
Prime cost of fir timber, per load	2	13	4
Sawing	0	12	6
Cartage	0	4	2
Waste, six feet	0	6	4
	£.3	16	4
Twenty per cent. profit	0	15	2
	£.4	11	6

feet.		*£.*	*s.*	*d.*		*foot.*
50	:	4	11	6	::	1

Ans. 1*s.* $9\frac{3}{4}$*d.*

Which may be charged in day-bills, as per Table, No. 1, at 1*s.* $9\frac{3}{4}$*d.* per foot cube.

TABLE, N°. 1.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £12. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	s. d.	s. d.	s. d.	s. d.
½-inch Deal	0 4	0 7	0 8¾	0 0¾	0 1
¾-do.	0 6	0 9	0 11¼	0 1	0 1½
1-do.	0 8	0 11	1 1¾	0 1¼	0 1¾
1¼-do.	0 10	1 1	1 4¼	0 1½	0 2¼
1½-do.	1 0	1 3	1 6¾	0 1¾	0 2½
2-do.	1 4	1 7	1 11¾	0 2¼	0 3¼
2½-do.	1 8	1 11	2 4¾	0 2¾	0 3¾
3-do.	2 0	2 3	2 9¾	0 3½	0 4½

Prime cost of fir timber at £2. 13*s*. 4*d*. per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	d.
Prime cost, at per foot cube	1	0¾
Ditto, with sawing	1	3¾
Ditto, including land-carriage, one mile	1	4¾
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	1	9¾

TABLE, Nº. 2.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £15. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
½-inch Deal	0 5	0 8	0 10	0 1	0 1¼
¾-do.	0 7½	0 10½	1 0½	0 1¼	0 1¾
1-do.	0 10	1 1	1 4¼	0 1¾	0 2
1¼-do.	1 0½	1 3½	1 7½	0 2	0 2½
1½-do.	1 3	1 6	1 10½	0 2¼	0 3
2-do.	1 8	1 11	2 4¾	0 2¾	0 3¾
2½-do.	2 1	2 4	2 11	0 3½	0 4½
3-do.	2 6	2 9	3 5¼	0 4¼	0 5½

Prime cost of fir timber at £3. 6*s.* 8*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	*d.*
Prime cost, at per foot cube	1	4
Ditto, with sawing	1	7
Ditto, including land-carriage, one mile	1	8
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	2	2¼

TABLE, N°. 3.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £18. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
½-inch Deal	0 6	0 9	0 11¼	0 1¼	0 1½
¾-do.	0 9	1 0	1 3	0 1½	0 2
1-do.	1 0	1 3	1 6¾	0 1¾	0 2½
1¼-do.	1 3	1 6	1 10½	0 2¼	0 3
1½-do.	1 6	1 9	2 2¼	0 2½	0 3½
2-do.	2 0	2 3	2 9¾	0 3¼	0 4½
2½-do.	2 6	2 9	3 5¼	0 4	0 5½
3-do.	3 0	3 3	4 0¾	0 5	0 6½

Prime cost of fir timber at £4. per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	*d.*
Prime cost, at per foot cube	1	7¼
Ditto, with sawing	1	10¼
Ditto, including land-carriage, one mile	1	11¼
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	2	6½

TABLE, N°. 4.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £21. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
½-inch Deal	0 7	0 10	1 0½	0 1¼	0 1½
¾-do.	0 10½	1 1½	1 5	0 1¾	0 2¼
1-do.	1 2	1 5	1 9¼	0 2¼	0 2¾
1¼-do.	1 5½	1 8½	2 1	0 2½	0 3¼
1½-do.	1 9	2 0	2 6	0 3	0 4
2-do.	2 4	2 7	3 3	0 4	0 5¼
2½-do.	2 11	3 2	3 11½	0 4¾	0 6¼
3-do.	3 6	3 9	4 8¼	0 5¾	0 7½

Prime cost of timber at £4. 13*s.* 4*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s. d.
Prime cost, at per foot cube	1 10¼
Ditto, with sawing	2 1¼
Ditto, including land-carriage, one mile	2 2¼
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	2 11¼

TABLE, No. 5.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £24. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.		Prime Cost, with Sawing and Land-Carriage.		May be charged at per Deal in Day-Bills.		May be charged at per foot Run in Day-Bills.		May be charged at per Foot Super in Day-Bills.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
½-inch Deal	0	8	0	11	1	1¾	0	1¼	0	1¾
¾-do.	1	0	1	3	1	6¼	0	1¾	0	2½
1-do.	1	4	1	7	1	11¾	0	2¼	0	3
1¼-do.	1	8	1	11	2	4¾	0	2¾	0	3¾
1½-do.	2	0	2	3	2	9¼	0	3¼	0	4½
2-do.	2	8	2	11	3	7¾	0	4¼	0	5¾
2½-do.	3	4	3	7	4	5¼	0	5¼	0	7¼
3-do.	4	0	4	3	5	3¾	0	6½	0	8¾

Prime cost of fir timber at £5. 6*s*. 8*d*. per load, containing 50 cubic feet, which is after the same ratio per foot cube, as the deals above described.

	s.	*d.*
Prime cost, at per foot cube	2	1½
Ditto, with sawing	2	4½
Ditto, including land-carriage, one mile	2	5½
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load for sawing, &c.	3	3¼

TABLE, N°. 6.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £27. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	s. d.	s. d.	s. d.	s. d.
½-inch Deal	0 9	1 0	1 3	0 1½	0 2
¾-do.	1 1½	1 4½	1 8	0 2	0 2½
1-do.	1 6	1 9	2 2¾	0 2½	0 3½
1¼-do.	1 10½	2 1½	2 7¼	0 3	0 4
1½-do.	2 3	2 6	3 1¼	0 3¾	0 4¾
2-do.	3 0	3 3	4 0¾	0 4¾	0 6½
2½-do.	3 9	4 0	5 0	0 6	0 8
3-do.	4 6	4 9	5 11¼	0 7¼	0 9½

Prime cost of fir timber at £6. per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	d.
Prime cost, at per foot cube	2	4¾
Ditto, with sawing	2	7¾
Ditto, including land-carriage, one mile	2	8¾
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	3	7½

TABLE, N°. 7.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £30. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.		Prime Cost, with Sawing and Land-Carriage.		May be charged at per Deal in Day-Bills.		May be charged at per Foot Run in Day-Bills.		May be charged at per Foot Super in Day-Bills.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
½-inch Deal	0	10	1	1	1	4¼	0	1½	0	2¼
¾-do.	1	3	1	6	1	10½	0	2¼	0	3
1-do.	1	8	1	11	2	4¾	0	2¾	0	3¾
1¼-do.	2	1	2	4	2	11	0	3½	0	5
1½-do.	2	6	2	9	3	5¼	0	4	0	5½
2-do.	3	4	3	7	4	4¼	0	5¼	0	7
2½-do.	4	2	4	5	5	6¼	0	6½	0	8¾
3-do.	5	0	5	3	6	6¾	0	8	0	10½

Prime cost of fir timber at £6. 13*s.* 4*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	*d.*
Prime cost, at per foot cube	2	8
Ditto, with sawing	2	11
Ditto, including land-carriage, one mile	3	0
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	4	0

Observe.—This is the Table upon which the following prices on Carpentry are entirely constructed, but only with reference to the prime cost of TIMBER; for deals, vide *Table*, No. 10.

TABLE, N°. 8.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £33. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
½-inch Deal	0 11	1 2	1 5½	0 1¼	0 2¼
¾-do.	1 4½	1 7½	2 0¼	0 2½	0 3¼
1-do.	1 10	2 1	2 7¼	0 3¼	0 4¼
1¼-do.	2 3½	2 6½	3 2	0 3¾	0 5
1½-do.	2 9	3 0	3 9	0 4½	0 6
2-do.	3 8	3 11	4 10¼	0 5¾	0 7¾
2½-do.	4 7	4 10	6 0½	0 7¼	0 9¾
3-do.	5 6	5 9	7 2¼	0 8¾	0 11½

Prime cost of fir timber at £7. 6*s.* 8*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	*d.*
Prime cost, at per foot cube	2	11¼
Ditto, with sawing	3	2¼
Ditto, including land-carriage, one mile	3	3¼
May be charged in day-bills, which includes 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	4	4

TABLE, N°. 9.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £36. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.		Prime Cost, with Sawing and Land-Carriage.		May be charged at per Deal in Day-Bills.		May be charged at per Foot Run in Day-Bills.		May be charged at per Foot Super in Day-Bills.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
½-inch Deal	1	0	1	3	1	6¾	0	2	0	2½
¾-do.	1	6	1	9	2	2¼	0	2¾	0	3½
1-do.	2	0	2	3	2	9¾	0	3½	0	4½
1¼-do.	2	6	2	9	3	5	0	4¼	0	5½
1½-do.	3	0	3	3	4	0¾	0	4¾	0	6½
2-do.	4	0	4	3	5	3¼	0	6¼	0	8½
2½-do.	5	0	5	3	6	6¼	0	7¼	0	10½
3-do.	6	0	6	3	7	9¾	0	9¼	1	0½

Prime cost of fir timber at £8. per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	d.
Prime cost, at per foot cube	3	2½
Ditto, with sawing	3	5½
Ditto, including land-carriage, one mile	3	6½
May be charged in day-bills, which include 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	4	8¾

TABLE, N°. 10.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £39. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	s. d.	s. d.	s. d.	s. d.
½-inch Deal	1 1	1 4	1 8	0 2	0 2½
¾-do.	1 7½	1 10½	2 4	0 2¾	0 3¾
1-do.	2 2	2 5	3 0¼	0 3	0 4¾
1¼-do.	2 8½	2 11½	3 9	0 4½	0 6
1½-do.	3 3	3 6	4 4½	0 5¼	0 7
2-do.	4 4	4 7	5 8¼	0 6¾	0 9
2½-do.	5 5	5 8	7 1	0 8½	0 11¼
3-do.	6 6	6 9	8 5¼	0 10¼	1 1½

Prime cost of fir, timber at £8. 13*s.* 4*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s. d.
Prime cost, at per foot cube	3 5½
Ditto, with sawing	3 8½
Ditto, including land-carriage, one mile	3 9½
May be charged in day-bills, which include 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	5 1

Observe.—This Table on deals, &c. has chiefly regulated the subsequent prices upon Joinery as well as Carpentry; and in all respects, as to the latter, in reference to the price of timber, in Table No. 7.

TABLE, N°. 11.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £42. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.		Prime Cost, with Sawing and Land-Carriage.		May be charged at per Deal in Day-Bills.		May be charged at per Foot Run in Day-Bills.		May be charged at per Foot Super in Day-Bills.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
½-inch Deal	1	2	1	5	1	9¼	0	2¼	0	2¾
¾-do.	1	9	2	0	2	2¼	0	2¾	0	3½
1-do.	2	4	2	7	3	2¾	0	3¼	0	5½
1¼-do.	2	11	3	2	3	11½	0	4¾	0	6¼
1½-do.	3	6	3	9	4	8¼	0	5½	0	7½
2-do.	4	8	4	11	6	1¾	0	7¼	0	9¾
2½-do.	5	10	6	1	7	7¼	0	9	1	0
3-do.	7	0	7	3	9	0¾	0	11	1	2½

Prime cost of fir timber at £9. 6*s.* 8*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	*d.*
Prime cost, at per foot cube	3	8¾
Ditto, with sawing	3	11¾
Ditto, including land-carriage, one mile	4	0¾
May be charged in day-bills, which include 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	5	5

TABLE, N°. 12.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £45. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	s. d.	s. d.	s. d.	s. d.
½-inch Deal	1 3	1 6	1 10½	0 2¼	0 3
¾-do.	1 10½	2 1½	2 7¼	0 3	0 4¼
1-do.	2 6	2 9	3 5¼	0 4	0 5½
1¼-do.	3 1½	3 4½	4 2½	0 5	0 6¾
1½-do.	3 9	4 0	5 0	0 6	0 8
2-do.	5 0	5 3	6 6¾	0 7¾	0 10½
2½-do.	6 3	6 6	8 1½	0 9¾	1 1
3-do.	7 6	7 9	9 8¼	0 11¾	1 3½

Prime cost of fir timber at £10. per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s.	d.
Prime cost, at per foot cube	4	0
Ditto, with sawing	4	3
Ditto, including land-carriage, one mile	4	4
May be charged in day-bills, which include 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	5	9¼

TABLE, N°. 13.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £48. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.		Prime Cost, with Sawing and Land-Carriage.		May be charged at per Deal in Day-Bills.		May be charged at per foot Run in Day-Bills.		May be charged at per Foot Super in Day-Bills.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
½-inch Deal	1	4	1	7	1	11¾	0	2½	0	3¼
¾-do.	2	0	2	3	2	9¾	0	3¼	0	4½
1-do.	2	8	2	11	3	7¼	0	4¼	0	5¾
1¼-do.	3	4	3	7	4	5¼	0	5¼	0	7
1½-do.	4	0	4	3	5	3¼	0	6¼	0	8½
2-do.	5	4	5	7	6	11¼	0	8¼	0	11
2½-do.	6	8	6	11	8	7¼	0	10¼	1	1¾
3-do.	8	0	8	3	10	3¾	1	0¼	1	4½

Prime cost of fir timber at £10. 13*s.* 4*d.* per load, containing 50 cubic feet, which is after the same ratio per foot cube, as the deals above described.

	s.	d.
Prime cost, at per foot cube	4	3¼
Ditto, with sawing	4	6¼
Ditto, including land-carriage, one mile	4	7¼
May be charged in day-bills, which include 20 per cent. profit, and an allowance of six feet for waste on each load for sawing, &c.	6	1½

TABLE, N°. 14.

Prime Cost of 10-feet 3-inch Deals, 9 inches wide, at £51. per Hundred in the Timber-Yard, reckoning Six Score to the Hundred, containing 225 Cubic Feet, or 4½ Loads of Timber.

Thicknesses.	Prime Cost of 10-feet Deals.	Prime Cost, with Sawing and Land-Carriage.	May be charged at per Deal in Day-Bills.	May be charged at per Foot Run in Day-Bills.	May be charged at per Foot Super in Day-Bills.
	s. d.	s. d.	s. d.	s. d.	s. d.
½-inch Deal	1 5	1 8	2 1	0 2½	0 3¼
¾-do.	2 1½	2 4½	2 11½	0 3½	0 4¾
1-do.	2 10	3 1	3 10¼	0 4½	0 6¼
1¼-do.	3 6½	3 9½	4 9	0 5¾	0 7½
1½-do.	4 3	4 6	5 7½	0 6¾	0 9
2-do.	5 8	5 11	7 4¾	0 8¾	0 11¾
2½-do.	7 1	7 4	9 2	0 11	1 2¾
3-do.	8 6	8 9	10 11¼	1 1¼	1 5½

Prime cost of fir timber at £11. 6*s.* 8*d.* per load, containing 50 cubic feet, which is after the same ratio, per foot cube, as the deals above described.

	s. d.
Prime cost, at per foot cube	4 6½
Ditto, with sawing	4 9½
Ditto, including land-carriage, one mile	4 10½
May be charged in day-bills, which include 20 per cent. profit, and an allowance of six feet for waste on each load, for sawing, &c.	6 6

Explanation of the given average prices of timber.

The subsequent abstract shows, at one view, the average prices at which fir timber has been estimated per load in the preceding Tables, with the price per foot cube, which may be charged in day-bills, from Table No. 1, to Table No. 14. The total amounts of which are added together, in order to ascertain, and at the same time to explain, the manner in which the average prices of timber have been calculated.

Table of the average prices of timber.

	Prime Cost of Timber. £.	s.	d.	May be charged in Day-Bills. s.	d.
Fir timber, at per load, according to Table, No. 1...	2	13	4	1	9¾
Do.......... do. .... No. 2...	3	6	8	2	2¾
Do.......... do. .... No. 3...	4	0	0	2	6½
Do.......... do. .... No. 4...	4	13	4	2	11¼
Do.......... do. .... No. 5...	5	6	8	3	3¼
Do.......... do. .... No. 6...	6	0	0	3	7½
Do.......... do. .... No. 7*..	6	13	4	4	0
Do.......... do. .... No. 8...	7	6	8	4	4
Do.......... do. .... No. 9...	8	0	0	4	8¾
Do.......... do. .... No. 10†.	8	13	4	5	1
Do.......... do. .... No. 11..	9	6	8	5	5
Do.......... do. .... No. 12..	10	0	0	5	9¼
Do.......... do. .... No. 13..	10	13	4	6	1½
Do.......... do. .... No. 14..	11	6	8	6	6
14)	98	0	0	2 18	4
	£.7	0	0	0 4	2

Average price of timber, how proved.

By the total amounts of the average prices being added together, it appears the produce is £98., which being divided by 14, the number of Tables, the product is £7.; consequently, that sum may be considered as the nearest price to be governed by; and as £6. 13*s.* 4*d.*, in the above abstract, approximates nearly to the amount, in Table, No. 7, it has been selected to govern the leading prices, but for timber only.

Further proof thereof.

It appears, also, that, by adding the average prices at which fir timber may be charged in day-bills, they are equal to the sum of £2. 18*s.* 4*d.*, which being also divided by 14, produces the sum of 4*s.* 2*d.*, and this also nearly corresponds with the price per foot cube, in Table, No. 7. Under these circumstances, it is evident that the principle adopted to ascertain an average scale upon which to act, is founded in truth, and therefore consistent with justice.

Elucidation of the five principal items in Carpentry.

Having communicated the plan that should be adopted in arriving at the correct average value of the works in question, the next step we shall take will be to explain the nature of the *five* principal items, under the head of rough car-

* The Table by which the price of timber is governed in the subsequent prices.

† The Table by which the prices of framed-work, &c. in deals is governed, and likewise every other description of work where deals are substituted for timber.

Continuation of the five principal items in Carpentry.

penter's work, which consists, in the *first* place, of fir in bond-timber, lintels, and wall-plates. *Secondly*, in rough fir, framed, consumed in floors, roofs, partitions, and works of a similar description. *Thirdly*, of the same material converted, which is not only framed, but wrought; that is, planed all round, which is frequently requisite in situations where the work is exposed to view. *Fourthly*, of fir, wrought, framed, and rebated; the meaning of which last term implies a species of grooving upon the edges of timber required in various sorts of works. *Fifthly*, of fir, wrought, framed, rebated, and beaded, in door-cases, and in works of similar denominations. Now, as the above *five* items comprise very considerable portions of the usual works in every building, it is necessary these prices should be fairly investigated, in order that we may proceed, in regular succession, to accomplish the object in view.

Elucidation of Table, No. 7.

According to the Table, No. 7, we find the average price of fir timber to be 4*s.* per foot cube (the natural price at the present period, and likely to continue), which includes cartage, sawing, an allowance of six feet for waste, which is liberal, and 20 per cent. profit. Of course, we must consider the raw article, at 4*s.* per foot cube, handsomely allowed for; and, therefore, in pursuance of the plan proposed, nothing further remains to be done but to exercise sound discretion, in adding rational prices for the labour to the prime cost of the materials, which should be consistent with the average value of labour, and a fair profit thereon. And, upon due consideration, with reference to the allowances made in the foregoing calculations, 7*d.* per foot cube, on the average, is considered a fair price for labour and nails upon rough fir, in bond timber, lintels, and wall-plates, &c.; 10*d.* upon rough fir, framed; 13*d.* upon fir, wrought and framed; 16*d.* upon fir, wrought, framed, and rebated; and 22*d.* upon fir, wrought, framed, rebated, and beaded; which prices for labour regulate the five subsequent articles on Carpenter's works, estimated upon the principle of the prime cost of timber, in Table, No. 7; as well as in all the preceding Tables, commencing with No. 1 and ending at No. 14. But, to elucidate this part of our subject, the Table, No. 7, has been selected, and because the following prices on rough Carpentry has reference thereto throughout this work.

Value of labour on fir timber.

Value of the labour on the five principal items of Carpentry.

Prime Cost of Timber, at £6. 13s. 4d. per Load, in reference to Table, *No. 7.*

Value of labour and materials on the five principal items.

	s.	*d.*
Fir, without any labour, per foot cube	4	0
1, Do. in bond-timber and lintels	4	7
2, Do. in framed work	4	10
3, Do. wrought and framed	5	1
4, Do. wrought, framed, and rebated	5	4
5, Do. wrought, framed, rebated, and beaded	5	10

Intermediate prices.

When the prime cost of timber is at any of the intermediate prices described in the Table, calculations should be made upon the preceding principles, by which means the exact value of the work may be correctly ascertained, and tables of prices made to suit any part of the kingdom; and, wherever the work is executed, due care should be taken to include all contingent expenses, in order that the prime cost *per foot cube*, in the leading article of *fir, without any labour*, may

Contingent expenses to be included.

embrace every expense up to the time the timber is converted, including the fair profit of 20 per cent.; which, although sometimes cavilled at by penurious valuators, is not, by any means, inconsistent, when compared with the great losses to which tradesmen are continually exposed in the prosecution of their business.

Further explanation of Tables, in reference to the qualities of timber.

In the preceding Tables of timber and deals, reference is made to only one description of fir timber, and to one sort of deals, which plan has been adopted in order to avoid falling into erroneous calculations. For, by mixing the qualities of materials at different prices, it would soon render the system as intricate as compounding numbers of various denominations; and, therefore, to preclude the confusion that must necessarily arise under such circumstances, we have hitherto avoided making any observations upon the different qualities of timber which are mixed up in public as well as private buildings. But, as it would be impossible to take an impartial view of the subject without animadverting upon the qualities of the materials of the same species, and used for the same purposes, it will be incumbent to show that the value of the work must have reference to the quality and value of the materials, as well as to the goodness of the workmanship. But, as it is well known that five different sorts of fir timber is constantly in use, and which vary in price and quality, how is it possible that one price can apply to each article, unless the average be taken conjunctively with the value of labour? It is true, the most correct method would be to value each description of timber by its relative prime cost; but, in a work of this description, which has been composed for the purpose of diffusing general information, by an average scale of prices, it would, it is presumed, be inconsistent to pursue any other course; we shall, therefore, endeavour to prove what is the average value of timber, according to the current prices of the United Kingdom. Taking into consideration that 50 cubic feet of fir timber is a load in this part of the kingdom, and 40 cubic feet in the sister country; but, as the relative value is the same in both places, the average price per foot cube will be easily comprehended by the following statement of 50 cubic feet to the load.

Various qualities of timber used for the same purposes.

Consistency to be observed in valuation thereof.

Relative value of timber in England and Ireland.

Five sorts of foreign fir timber in common use.

	£.	s.	d.
Prime cost of Dantzic and Riga, per load............	7	0	0
Ditto for Memel	6	15	0
Ditto for Brewick................................	6	5	0
Ditto for best American pine......................	6	0	0
Ditto for inferior pine............................	4	10	0
5)	30	10	0
Average price	£.6	2	0

Average value of timber considered.

Now, by the foregoing abstract, it appears that £6. 2*s.* is the average price per load; but as the latter produces fractions in the sub-division into cubic feet, it would be as well to consider the price at 2*s.* 6*d.* per foot, which will be after the rate of £6. 5*s.* per load; and this may be considered the average price in every part of the kingdom. But, where Dantzic, Memel, Brewick, or American pine and spruce timber, is entirely used in the same building, the prices should then be estimated according to their respective prime costs.

In the Table, No. 7, to which the subsequent prices of timber alludes, the value of it is estimated at £6. 13*s*. 4*d*. per load, in order that it may correspond with the deals in the same table. The scientific builder will, therefore, perceive that we have been liberal in allowances; yet it will appear that our prices differ materially from those in general circulation. The average price of fir timber compared.

An abstract of the deals, from Table, No. 7, will show the price at which deals of their various thicknesses may be charged, per feet run and superficial, in day-bills, when the prime cost of ten-feet three-inch deals are at £30. per hundred, as per table, supposing the average price to be reduced to the relative average market-price of timber; but as the current prices of timber and deals, as before observed, are always at variance, as regards their cubical estimation, it will be necessary to show in what way the average price of deals has been ascertained, in order that the scales, by which the subsequent prices have been regulated, may be duly appreciated, by the Tables, Nos. 7 and 10, which may be considered, at the present, and perhaps at any period, as *fair average tables* for regulating the leading articles of Carpentry and Joinery, comprised in the several thicknesses of deals usually employed in building. Reasoning upon the correct method of finding the average. Reference to the fair average Tables.

Now, as the cubical contents of one hundred ten-feet three-inch deals is 225 cubic feet, it would appear that when they are at £39. per hundred, that £6. 13*s*. 4*d*. is the fair value for a load of timber, as per Table, No. 7; but, as the current prices of the various sorts of timber, and the current prices of the different sorts of deals never agree, in reference to their superficial or cubical contents, it will be requisite to show, in the admixture of materials of the same species, how it arises that the same sort of materials do not at all times correspond, in degrees of similitude, as to their value, as will appear by the following list, which contains the average prime cost of the several description of deals at all times in general use, not only in the metropolis, but in every part of the kingdom. On the value of the cubical contents of ten-feet deals.

Table, showing the average Prime Cost of three-inch Deals.

ft.		£.	s.	d.
8	The best eight-feet deals, three inches thick, per hundred	30	0	0
8	Do. seconds	27	0	0
8	Do. thirds	25	0	0
10	The best ten-feet three-inch deals per hundred	40	0	0
10	Do. seconds	35	0	0
10	Do. thirds	30	0	0
12	The best twelve-feet three-inch deals per hundred	50	0	0
12	Do. seconds	45	0	0
12	Do. thirds	40	0	0
14	The best fourteen-feet three-inch deals per hundred	55	0	0
14	Do. seconds	50	0	0
14	Do. thirds	45	0	0
10)132	equal to 13 ten-feet three-inch deals, and 2 over.	12) 472	0	0
		£. 39	6	8

The annexed Table shows the correct method of finding the average price.

Explanation, proving the system to be correct.

Hence, it will appear, if 13 be multiplied by 120, it will produce 1560, which is equal to 1,300 of ten-feet three-inch deals. Then say, if 1560 ten-feet three-inch deals cost £472., what will one ten-feet three-inch deal cost? which will point out which of the preceding tables should govern the average prices of the deals, in the subsequent description of works on Joinery as well as Carpentry.

The previous question proved.

```
deals.        £.       deal.
1560    :    472   ::   1
              20
        ---------
   1560) 9440 (6s.
         9360
         ----
         ..80
           12
         ----
          960          120
            4            6
         ----         ----
   1560) 3840 (½d.   2,0) 72,0
         3120         -------
         ----   Aver. ..£.36 0 0  per hund.
         .720         =======
         ====         Or .... 6s. per deal.
```

The fraction ½d. unnoticed.

The Table, No. 10, proved to be the correct average guide.

Now, by the foregoing calculation, it is evident that the average price of ten-feet three-inch deals is £36. per hundred, which accords with the Table, No. 9, wherein it will be seen that ten-feet three-inch deals are estimated at 6*s.* each, in the prime cost column; but, taking into consideration that a greater proportion of *prime* deals are used on the average than the inferior sort, we have fixed upon the Table, No. 10, as the average table, wherein it will also appear that the prime cost of ten-feet three-inch deals are £39. per hundred, and, of course, the ten-feet three-inch deals at 6*s.* 6*d.* each. This mode of arranging the prices has been duly considered, with references to the employer and employed; and we trust it will give all parties, who may be interested in the development of such matters, general satisfaction.

Observations on the erroneous methods of calculating.

It is well known to those concerned in the building profession, that, although it is the custom, in works of this description, to calculate the value by the highest prices of timber and deals; yet it seldom happens, except in public buildings, that materials of the best description are used throughout; and, in consequence thereof, a work of this description has been called for, as being essentially necessary to point out some of the growing evils arising out of information, perhaps well-intended, but which, we think, in the highest degree, calculated to destroy all manner of confidence between man and man, as regards the honest value of Carpenters' and Joiners' works.

Principles to be adopted where different qualities of materials are introduced.

Wherever it happens that the first and second best materials are converted for the purposes described, the price of the work should be estimated accordingly; and, in like manner, if the materials converted should be of the third-rate quality, then the same course should be adopted; but where they are incorporated and

compounded with various qualities, which is commonly the case in repairs, and also in buildings erected upon speculation on leasehold ground, the average current price of timber and deals should be resorted to, as the only criterion to regulate the value of the several works in question; and where these or similar principles are not adopted, it is impossible that the scales of justice can be equitably poised, as between buyer and seller, or employer and employed.

Leasehold ground.

It must be remembered that battens may be charged at two-thirds the value of the deals in the several tables, which, on the average, may be estimated at £26. per hundred; and in proportion for clean or picked deals, free from knots and other imperfections.

Battens may be charged.

Having now, as we conceive, prepared the mind with a series of documents, to establish the consistency of creating prices according to circumstances, we shall proceed, in detail, to enumerate such general lists of Carpenters' and Joiners' works as are usually required in public and private edifices, taking into consideration the value of the labour, including allowances for waste, and at the same time incorporate the value of the glue, nails, and screws, where requisite, commencing first with three-inch deals, and successively in progression, up to half-inch deals, the separate value of each of which items, as charged at per foot superficial in the preceding Table, No. 10, being deducted from the amounts of the several prices, as hereinafter described, will show the allowances for labour, according to the recent advance of wages, including waste, with liberal profits thereon, in addition to the profits on the materials, as explained in the tables. This information being given, it is presumed unnecessary to crowd the work with a series of ambiguous prices for labour only, upon which so many vague and indefinite opinions are entertained, even by men of the greatest intelligence and soundest judgement. The ingenious artisan, who has rendered himself competent to the execution of scientific works, required to be superlatively done, ought to be paid in proportion to his talent and industry; but as adroitness and human ingenuity cannot be correctly measured or valued by any definite rule which can prove generally satisfactory, the value of the labour ought to be left, in all cases of doubt, to the judgement and sound discretion of the valuator, who is usually governed by the goodness, difficulty, and neatness of workmanship. Presuming, therefore, that the following description of works is to be performed in a workmanly manner, the value for the labour has been regulated accordingly; but, with due respect, in cases of doubt, information is recommended to be obtained through the medium of experienced *Architects*, *Surveyors*, and *Scientific Builders*. Of such, many have most liberally contributed towards the perfection of this Work; and their sentiments are in accordance with our own, as to the necessity of communicating every species of information upon a subject, which is intended, not only to promote the interest of the building profession, but likewise to instruct the rising generation in the correct principles which are requisite to ensure success and honourable patronage.

Glue, nails, and screws, to be incorporated.

Allowances according to the late advance of wages.

The proper persons to value ingenious works.

THE AVERAGE PRICES

OF

MASTER CARPENTERS' AND JOINERS' WORKS,

INCLUDING THE MATERIALS,

ESTIMATED FROM THE PRIME COST OF TEN-FEET THREE-INCH DEALS, IN TABLE, NO. 10; AND FOR FIR TIMBER, AS PER TABLE, NO. 7.*

Three-inch Deal, at per Foot Super. according to TABLE, *No.* 10.

		s.	d.
3-inch deal.	Rough three-inch deal, without any labour, but with 25 per cent. profit, which includes waste	1	1½
	Do. with labour and nails	1	3¾
	Do. with edges shot	1	4
	Do. ploughed and tongued	1	5¾
	Do. planed one side	1	5¾
	Do. ploughed and tongued	1	6¾
	Do. dovetailed	1	9¼
	Do. framed	1	9¾
	Do. planed two sides	1	7¼
	Do. ploughed and tongued	1	8¾
	Do. keyed or clamped	1	9½
3-inch gates.	Three-inch deal twelve-paneled gates, bead, butt, and square	2	11
	Do. bead and flush	3	1
	Do. bead and flush, both sides	3	4
	Do. with twenty panels, or more, and wicket-gate	3	8

Two-inch and half Deal, at per Foot Super. according to TABLE, *No.* 10.

		s.	d.
2½-inch deal.	Rough 2½-inch deal, without any labour, but with 25 per cent. profit, which includes waste	0	11¼
	Do. with labour and nails	1	2
	Do. with edges shot	1	2½
	Do. ploughed and tongued	1	3½
	Do. planed one side	1	3½
	Do. ploughed and tongued	1	5
	Do. clamped	1	6½
	Do. framed	1	7
	Do. planed two sides	1	5
	Do. ploughed and tongued	1	6½
	Do. keyed and clamped	1	7½

* The recent advance of 6*d.* per day upon Carpenters' and Joiners' wages, in the metropolis, has caused the author to increase the prices in proportion to the wages adverted to in page 13, which was printed before this part of our work.

	s.	d.	
$2\frac{1}{2}$-inch deal six-panel square doors	1	$8\frac{1}{2}$	$2\frac{1}{2}$ inch deal six-panel doors.
Do. moulded panels, one side	1	$9\frac{1}{4}$	
$2\frac{1}{2}$-inch deal six-panel bead, butt, and square, doors	1	$10\frac{1}{4}$	
Do. bead, flush, and square	1	$10\frac{3}{4}$	
Do. moulded panels on both sides	2	0	
Do. bead and butt	2	1	
Do. bead and flush	2	2	
Do. bead, butt, and flush	2	3	
Do. bead and flush, two sides	2	4	
$2\frac{1}{2}$-inch deal four-panel square doors	1	$7\frac{3}{4}$	$2\frac{1}{2}$-inch deal four-panel doors.
Do. moulded panels, one side	1	9	
$2\frac{1}{2}$-inch deal four-panel, bead, butt, and square doors	1	$9\frac{3}{4}$	
Do. bead, flush, and square	1	10	
Do. moulded panels, both sides	1	$10\frac{1}{2}$	
Do. bead and butt	1	11	
Do. bead and flush	2	0	
Do. bead, butt, and flush	2	$0\frac{1}{2}$	
Do. bead flush, two sides	2	1	
$2\frac{1}{2}$-inch deal two-panel square doors	1	7	$2\frac{1}{2}$-inch deal two-panel doors.
Do. moulded panels, one side	1	8	
$2\frac{1}{2}$-inch deal two-panel bead, butt, and square, doors	1	$8\frac{1}{2}$	
Do. bead, flush, and square	1	9	
Do. bead, butt, and flush	1	$9\frac{1}{2}$	
Do. bead flush both sides	1	10	
$2\frac{1}{2}$-inch deal framed gates, with half-framed rails and braces, filled in with $1\frac{1}{4}$-inch deal, rebated and beaded	2	1	$2\frac{1}{2}$-inch deal gates.
Do. with battens	2	$4\frac{1}{4}$	
Do. gates, framed, flush and square, with 20 panels	2	$4\frac{1}{2}$	
Do. bead flush both sides	2	$8\frac{1}{2}$	
Do. pallisadoe-gates, lower part bead, butt, and square, filled in with pallisadoe	2	2	
Do. bead flush bottom	2	3	
Do. in 18 panels, bead, flush, and square	2	6	

As the value of gates, of the above description, entirely depends upon their designs, the prime cost of the time and materials should be kept, in order that suitable prices may be ascertained. *Prime cost of gates.*

Two-inch Deal, at per Foot Super. according to TABLE, *No.* 10.

	s.	d.	
Rough 2-inch deal, without any labour, but with 25 per cent. profit, which includes waste	0	9	2-inch deal.
Do. with labour and nails	0	$11\frac{1}{4}$	
Do. with edges shot	0	$11\frac{3}{4}$	
Do. planed one side	1	$0\frac{3}{4}$	
Do. ploughed and tongued	1	$2\frac{1}{4}$	
Do. dovetailed	1	$3\frac{1}{4}$	
Do. framed and clamped	1	$4\frac{1}{4}$	

		s.	d.
2-inch deal.	2-inch deal, planed two sides	1	2¼
	Do. ploughed and tongued	1	3¼
	Do. keyed and clamped	1	4¼
	Do. dovetailed	1	4¾
	Do. in drawer fronts	1	5½
2-inch deal six-panel doors.	2-inch deal six-panel square doors	1	5½
	Do. moulded one side	1	6¾
	Do. bead, butt, and square	1	6¼
	Do. bead, flush, and square	1	7¼
	Do. moulded on both sides	1	8
	Do. bead and butt	1	8½
	Do. bead flush and bead butt	1	9
	Do. bead-flush, both sides	1	9½
2-inch deal four-panel doors.	2-inch deal four-panel square doors	1	5½
	Do. moulded on one side	1	6½
	Do. bead, butt, and square	1	6½
	Do. bead, flush, and square	1	7
	Do. moulded on both sides	1	7½
	Do. bead and butt	1	7½
	Do. bead and flush	1	8
	Do. bead, flush, and butt	1	8½
	Do. bead flush both sides	1	9
2-inch deal two-panel doors.	2-inch deal two-panel square doors	1	4½
	Do. moulded one side	1	5
	Do. bead, butt, and square	1	5½
	Do. bead, flush, and square	1	6
	Do. moulded on both sides	1	6½
2-inch deal sash-doors.	2-inch deal ovolo sash two-panel square doors	1	5
	Do. moulded and square, or bead butt	1	5½
	Do. bead, flush, and square	1	6
	Do. both sides moulded	1	6½
	Do. do. and bead butt	1	6½
	Do. do. and bead flush	1	7
	Do. bead, flush, and butt	1	7½
	Do. bead flush, both sides	1	8
2-inch deal partitions.	2-inch deal square framed partitions	1	4½
	Do. moulded and square, or bead butt	1	5
	Do. bead, flush, and square	1	5½
	Do. both sides moulded	1	6½
	Do. do. and bead and flush	1	7
	Do. bead, flush, and butt	1	7½
	Do. bead flush, both sides	1	8
2-inch deal outside doors.	2-inch deal six-panel outside doors, the upper panels quirk ovolo bead and square back, bottom panels bead flush, with bead butt or moulded backs	1	10
	Do. bead butt or moulded back	1	10½
	Do. bead flush back	1	11½

	s.	d.	
2-inch deal six-panel doors, the four upper panels raised, and moulded square back	1	11	2-inch deal doors.
Do. and bead butt back	1	11½	
Do. and bead flush back	2	0	
2-inch deal two-panel doors, the upper part quirk ovolo bead and square backs, the bottom panel bead flush, with bead butt or mould back	1	7½	
Do. three-panel do.	1	8	
Do. four-panel do.	1	8½	

For all manner of external or internal doors which vary from such as are not in general use, an account should be kept of the time and materials, and if measured, the price computed in reference to the prime cost, or dissected in the manner before described. *Prime cost of doors.*

Inch-and-half Deal, at per Foot Super, according to TABLE, *No.* 10.

	s.	d.	
Rough 1½-inch deal, without any labour, but with 25 per cent. profit, which includes waste	0	7	1½-inch deal.
Do. with labour and nails	0	9¼	
Do. with edges shot	0	9¾	
Do. planed one side	0	10½	
Do. ploughed and tongued	0	11¼	
Do. dove-tailed	1	0¼	
Do. planed two sides	1	0	
Do. ploughed and tongued	1	1	
Do. keyed or clamped	1	2	
Do. dove-tailed	1	3	
Do. in drawer-fronts, &c.	1	3½	
1½-inch deal single rebated door-linings	1	2	1½-inch deal door-linings and grounds.
Do. and beaded	1	2½	
Do. double rebated	1	3	
Do. and beaded	1	3½	
1½-inch deal one-panel door-linings	1	2½	
Do. moulded or bead butt	1	3	
Do. bead flush	1	3½	
Do. with raised mouldings	1	4	
1½-inch deal skeleton or framed grounds	0	11½	
1½-inch deal six-panel square doors	1	2	1½-inch deal six-panel doors.
Do. moulded and square, or bead butt	1	3	
Do. bead, flush, and square	1	4	
Do. bead, flush, and butt, or mould back	1	4	
Do. both sides moulded	1	4	
Do. bead flush, both sides	1	5	
Do. bead butt, or moulded back	1	5	
Do. and bead flush back	1	5½	
Do. both sides	1	6	
1½-inch deal four-panel skeleton doors	0	8½	1½-inch deal four-panel doors.
Do. flush-paneling for covering, square back	1	1	
Do. flush on both sides for ditto	1	2	

		s.	d.
1½-inch deal four-panel doors.	1½-inch deal four-panel square doors	1	1
	Do. moulded and square, or bead butt	1	1
	Do. bead, flush, and square	1	2
	Do. bead, flush, and butt, or moulded back	1	2½
	Do. moulded on both sides	1	3½
	Do. bead flush, both sides	1	4
1½-inch deal two-panel doors.	1½-inch deal two-panel square doors	1	1
	Do. moulded and square, or bead and butt	1	2
	Do. both sides moulded	1	2½
1½-inch deal sash-doors.	1½-inch deal ovolo sash two-panel square doors	1	2½
	Do. moulded and square, or bead butt	1	3
	Do. bead, flush, and square	1	3½
	Do. both sides moulded	1	4
	Do. do. and bead butt	1	4
	Do. do. and bead flush	1	4½
	Do. bead, flush, and butt	1	5
	Do. bead flush, both sides	1	5½
1½-inch deal partitions.	1½-inch deal framed square partitions	1	1¼
	Do. moulded and square, or bead butt	1	2½
	Do. bead, flush, and square	1	3
	Do. both sides moulded	1	4
1½-inch deal columns and pilasters.	1½-inch deal diminished columns, glued and blocked, not less than 15 inches diameter	3	6
	Do. from 14 inches to 9 inches diameter	3	9
	Do. under 9 inches diameter	3	11
	1½-inch deal pilasters	1	6
1½-inch deal skirtings.	1½-inch deal plain level skirting	1	1
	Do. torus skirting	1	2
	Do. plain raking	1	3½
	Do. torus	1	4

Inch-and-Quarter Deal, at per Foot Super. according to TABLE, *No.* 10.

		s.	d.
1¼-inch deal.	1¼-inch deal, without any labour, but with 25 per cent. profit, which includes waste	0	6
	Do. with labour and nails	0	8¼
	Do. with edges shot	0	8½
	Do. planed one side	0	9½
	Do. ploughed and tongued	0	9¼
	Do. clamped	0	11
	Do. planed both sides	0	10¼
	Do. ploughed and tongued	0	11½
	Do. keyed or clamped	1	0
	Do. dove-tailed	1	1½
	Do. in drawer-fronts	1	2
1¼-inch deal skirtings.	1¼-inch deal plain level skirtings	0	11¼
	Do. torus do.	1	0½
	Do. plain raking do.	1	2

	s.	d.	
1¼-inch deal torus raking-skirtings	1	2	
Do. framed square window-backs	1	0	1¼-inch deal window-backs.
Do. bead butt	1	1½	
Do. moulded	1	2	
Do. bead flush	1	2½	
Do. raised moulding	1	2½	
1¼-inch deal framed circular one edge	1	6	1¼-inch deal window-backs, elbows, and soffits.
Do. moulded	1	8½	
Do. bead flush	1	9½	
Do. raised moulding	1	9½	
Do. square-framed circular two edges	1	11¾	
Do. bead butt	2	2	
Do. moulded	2	3	
Do. bead flush	2	4	
Do. raised moulding	2	5	
1¼-inch deal splayed boxings for inside-shutters	1	4½	1¼-inch deal boxings for inside shutters.
Do. square do.	1	3½	
Do. circular on the plan	1	10	
Do. semicircular heads	2	4	
1¼-inch deal clamped flap-shutters, one height	1	2	1¼-inch deal inside shutters.
Do. four-panel framed square, in two heights	1	4	
Do. bead butt	1	5	
Do. moulded	1	6	
Do. bead, flush, and square	1	6	
Do. moulded and bead butt	1	7	
Do. bead, flush, and butt	1	8	
1¼-inch deal two-panel sliding-shutters	1	1	1¼-inch deal sliding shutters.
Do. bead, butt, and square	1	1½	
Do. moulded	1	2	
Do. bead, flush, and square	1	2	
Do. moulded and bead butt	1	3½	
Do. bead, flush, and butt	1	3	
1¼-inch deal clamped outside-shutters	1	0½	1¼-inch deal outside shutters.
Do. two-panel square do.	1	1	
Do. bead, butt, and square	1	1	
Do. bead, flush, and do.	1	2½	
Do. bead, flush, and butt	1	4	
1¼-inch deal two-panel square shutters	1	1	1¼-inch deal inside shutters, for shops and fronts, &c.
Do. bead, butt, and square	1	2	
Do. bead, flush, and square	1	2½	
Do. bead, flush, and butt	1	4	
Do. bead flush, both sides	1	4½	
1¼-inch deal three-panel bead, butt, and square shutters	1	2½	
Do. bead, flush, and square	1	3	
Do. bead, flush, and butt	1	5	
1¼-inch deal framed enclosures	1	0½	
Do. bead butt	1	1½	

		s.	d.
	1¼-inch deal framed enclosures, moulded	1	1¼
	Do. bead flush	1	2
1¼-inch deal door-linings.	1¼-inch deal single rebated door-linings	1	0
	Do. and beaded	1	0½
	Do. double rebated	1	1
	Do. beaded	1	1½
	1¼-inch deal one-panel square single-rebated linings	1	0½
	Do. bead butt	1	1
	Do. moulded	1	1
	Do. bead flush	1	1½
	Do. moulded	1	1½
	Do. with raised mouldings	1	2
1¼-inch deal framed grounds.	1¼-inch deal framed grounds	1	0
	Do. with semicircular heads	1	10
	Do. circular on the plan	1	5
1¼-inch deal framed dwarf-doors.	1¼-inch deal one-panel square dwarf-doors	1	1
	Do. bead butt	1	2
	Do. moulded and square	1	2
	Do. bead, flush, and square	1	2½
	Do. with projecting mouldings	1	3
1¼-inch deal room-doors.	1¼-inch deal two-panel square doors	0	11½
	Do. bead butt	1	0
	Do. moulded and square	1	0
	Do. four-panel square doors	1	0
	Do. bead butt	1	1
	Do. moulded and square	1	1
	Do. bead, flush, and square	1	1½
	Do. bead, flush, and butt	1	2
1¼-inch deal ledged-doors.	1¼-inch rough deal ledged-doors	0	11
	Do. planed	0	11½
	Do. ploughed, tongued, and beaded	1	0
1¼-inch deal dwarf wainscoting and partitions.	1¼-inch deal square dwarf-wainscoting	0	10¾
	Do. moulded	0	11½
	Do. bead flush	1	0
	1¼-inch deal square framed partitions	1	0
	Do. diminished columns, glued and blocked, not less than 15 inches diameter	2	9
	Do. from 15 inches to 9 inches	3	0
	Do. under 9 inches	3	4

Inch Deal, at per Foot Super. according to Table, *No.* 10.

		s.	d.
Inch deal.	Rough inch-deal, without any labour, but with 25 per cent. profit upon the prime cost, which includes waste	0	4¼
	Do. with labour and nails	0	6¾
	Do. with edges shot	0	7½
	Do. planed one side	0	8
	Do. ploughed and tongued	0	8½

	s.	d.	
Rough 1-inch deal, clamped	0	9½	1-inch deal.
Do. planed both sides	0	9	
Do. ploughed and tongued	0	9½	
Do. clamped	0	10	
Do. dove-tailed	0	11½	
Do. in drawers	0	11½	
Do. in fronts	1	0½	
1-inch deal square skirting	0	9½	1-inch deal skirtings.
Do. torus do.	0	10	
Do. plain raking do.	1	0	
Do. torus do.	1	0½	
1-inch deal keyed dado	0	10½	1-inch deal dado.
Do. raking do.	0	11½	
Do. circular on the plan	1	9	
Do. and sharp curve	2	0	
1-inch deal two-paneled square back-linings	0	11	1-inch deal back-linings.
Do. two-panel bead butt	1	0	
Do. three-paneled square linings	0	11½	
Do. do. bead butt	1	0¼	
Do. four-paneled square linings	1	0	
Do. do. bead butt	1	1	
1-inch deal plain keyed	0	11½	1-inch deal window-backs, &c.
Do. square framed	1	0	
1-inch deal splayed window-boxings	1	3¾	1-inch deal window-boxings and shutters.
Do. square do.	1	2½	
1-inch deal clamped shutters in one height	0	11	
Do. in two panels, square framed	1	1½	
Do. bead butt	1	2½	
Do. moulded and square	1	2½	
Do. bead, flush, and square	1	3	
Do. bead, flush, and butt	1	4	
1-inch deal two-panel square shutters	0	11	1-inch deal outside shutters.
Do. clamped do.	0	10½	
1-inch deal framing to inclosures	0	10½	
Do. bead butt	0	11	
Do. moulded	0	11	
1-inch deal single rebated door-linings	0	10½	1-inch deal door-linings.
Do. and beaded	0	11	
Do. double rebated	0	11½	
Do. do. and beaded	1	0	
1-inch deal framed grounds	0	10½	1-inch deal framed grounds.
Do. circular on the plan	1	3¾	
1-inch deal one-panel dwarf-doors	0	11½	1-inch deal dwarf-doors.
Do. bead butt	1	0½	
Do. moulded and square	1	0½	
Do. bead, flush, and square	1	1	
1-inch deal four-panel square doors	0	11	1-inch deal room doors.

		s.	d.
	1-inch deal four-panel square doors, moulded	0	11½
	Do. bead, butt, and square	0	11½
	Do. two-pannel square doors	0	10½
1-inch deal ledged doors.	1-inch deal rough-ledged doors	0	9½
	Do. planed do.	0	10
	Do. ploughed, tongued, and beaded	0	10½
1-inch deal wainscoting.	1-inch deal framed wainscoting	0	9½
	Do. dwarf do.	0	10
	Do. glued and blocked	0	10½

Three-quarter Inch Deal, at per Foot Super. according to TABLE, *No.* 10.

		s.	d.
¾-inch deal.	¾-inch deal, without any labour, but with 25 per cent. profit on the prime cost, which includes waste	0	3¾
	Do. with labour and nails	0	5½
	Do. with edges shot	0	6
	Do. planed one side	0	7
	Do. grooved and tongued	0	7½
	Do. curved to soffits, &c.	0	10
	¾-inch deal, planed two sides	0	7½
	Do. grooved and tongued	0	8
	Do. keyed and clamped	0	9
	Do. dovetailed in drawers	0	11
	Do. in covers and bearers	0	9½
	Do. to doors and chimneys	0	11½
¾-inch deal skirtings.	¾-inch deal square skirting	0	7¾
	Do. torus skirting	0	9
	Do. plain do., scribed to steps	0	10½
	Do. torus do.	1	0
	Do. rebated plinth to base moulding	0	8½
	Do. raking do.	1	0
	Do. plain level circular skirting	1	3¾
	Do. torus do.	1	5½
	Do. plain circular raking do.	1	9½
	Do. torus do.	1	11¾
¾-inch deal ledged doors.	¾-inch deal rough-ledged doors	0	8
	Do. planed	0	8½
	Do. ploughed, tongued, and beaded	0	9¾

Half Inch Deal, at per Foot Super. according to TABLE, *No.* 10.

		s.	d.
½-inch deal.	½-inch deal, without any labour, but including 25 per cent. profit on the prime cost, which includes waste	0	2½
	Do. with labour and nails	0	4¼
	Do. with edges shot	0	4¾
	Do. planed one side	0	5¼
	Do. grooved and tongued	0	5¾
	Do. bent to soffits, &c.	0	7¼
	Do. planed two sides	0	8¼

	s.	d.
½-inch deal, grooved and tongued	0	6¾
Do. dovetailed in drawers	0	9¾
Do. in covers and bearers	0	7¾
Do. in chimney caps, &c.	0	8¾

Observations on the foregoing Prices of Joinery.

In the preceding calculations, which include the *average* value of the materials, labour, profit, and land-carriage, to the distance of one mile, our principal object has been to communicate correct ideas of what prices may be fairly charged, supposing the materials to be mixed in the proportionate ratios before described. Profit and land-carriage.

In the few items which have been selected to elucidate this part of our work, great pains have been taken to arrange them with order and perspicuity: the sincerest hope, therefore, is entertained that the perusal of them will prove satisfactory to those who are in search of general information. Perspicuity in the arrangement of prices requisite.

And, taking the subject into consideration, with reference to the foregoing calculations, we are of opinion that the subjoined condensed general average prices will be found extremely useful in making estimates; under the supposition that the aggregate quantities of work to be performed may or will be composed of works, in like degrees of similitude, both as regards the materials and labour, which will serve to reduce the antecedent prices to the following average standard, and at the same time present to the mind a scale of prices, easy to comprehend and to remember, as the number of items will then only consist of eight, the usual thicknesses of deals known to be used in building. Condensed average prices useful in estimating materials and labour.

First List, comprising the average Value of 3-inch Deal Framing, with reference to the foregoing calculations, in Table, *No.* 10, *including all Materials.*

Average value of deal framing, in reference to Table, No. 10.

	s.	d.
3-inch deal framing, at per foot super	1	11
2½-inch do.	1	8
2-inch do.	1	5
1½-in. do.	1	2
1¼-in. do.	1	0½
1-in. do.	0	11
¾-in. do.	0	9
½-in. do.	0	7

It is but candid to observe, that the last-mentioned and subsequent condensed lists of prices will be only applicable to such works as are square, and which may be found to approximate to the general lists of those before described. Square framing.

It cannot be too often repeated, that the antecedent and subsequent prices of Joinery have been governed by the Table, No. 10, which embrace the general average value of ten-feet three-inch deals, at £39. per hundred; at which rate, it is presumed, the average prices of deals may be estimated in every part of the kingdom. The value, therefore, of the raw materials, at per foot superficial and Average value of 10-ft. 3-in. deals at £39. per hundred.

By examination it will appear 20 per cent. profit is allowed, and 5 per cent. for waste.

running measure, being deducted, as before-mentioned, from the general prices, will show the various sums allowed for labour and nails, with the profit thereon, in addition to the profit of 25 per cent., which includes waste, on the materials, as comprised in the valuation of deals, which may be ascertained by the inspection of Table, No. 10, and the residue of the tables constructed for similar purposes.

Average difference in the value of framing.

Now, by the preceding arrangement of prices, regulated by the thicknesses of deals, it will be observed, that the average difference in the value of framing, in reference to the various sorts of workmanship, is not equal to what might be expected, and more especially where the excellence or degrees of goodness in labour may happen to arise among the same description and thicknesses of deals. From hence, it is evident that general average prices may be found with great ease, which, it is presumed, will answer every purpose in common calculations, and spare an infinity of trouble; to effect which, these ideas are with pleasure communicated, for the use of those who may not always find leisure to enter into the detail and minutiæ of estimates.

Second List of general average Prices of Deal Framing, when 10-feet 3-inch Deals are at £42. per Hundred, as per Table, *No.* 11.

The annexed is a similar Table to the former.

	s.	*d.*
3-inch deal framing, at per foot super	2	0½
2½-in. do.	1	9
2-in. do.	1	6
1½-in. do.	1	3
1¼-in. do.	1	1
1-in. do.	1	0
¾-in. do.	0	10½
½-in. do.	0	7½

Third List of general average Prices of Deal Framing, when 10-feet 3-inch Deals are at £45. per Hundred, as per Table, *No.* 12.

This Table is likewise in similitude to the preceding

	s.	*d.*
3-inch deal framing, at per foot super	2	1½
2½-in. do.	1	10
2-in. do.	1	7
1½-in. do.	1	3½
1¼-in. do.	1	1½
1-in. do.	1	0
¾-inch do.	0	9¾
½-inch do.	0	7¾

Fourth List of general average Prices of Deal Framing, when 10-feet 3-inch Deals are at £48. per Hundred, as per Table, *No.* 13.

This Table is also correspondently constructed.

	s.	*d.*
3-inch deal framing, at per foot super	2	2½
2½-in. do.	1	10¾
2-in. do.	1	7½
1½-in. do.	1	3¾

	s.	d.
1¼-inch deal framing, at per foot super	1	1¾
1-in. do.	1	0¼
¾-in. do.	0	10
½-in. do.	0	8

Fifth List of general average Prices of Deal Framing, when 10-feet 3-inch Deals are at £51. per Hundred, as per TABLE, *No.* 14.

	s.	d.	
3-inch deal framing, at per foot super	2	3½	And this Table in like manner to the four preceding.
2½-in. do.	2	0¼	
2-in. do.	1	8¾	
1½-in. do.	1	4½	
1¼-in. do.	1	2¼	
1-in. do.	1	0¾	
¾-in. do.	0	10¼	
½-in. do.	0	8¼	

By the five preceding lists, it will be seen, at one view, that a series of prices have been condensed within a narrow compass, for the purpose of estimating upon general principles, which will be found extremely useful where dispatch is required, in making estimates and generalized calculations. General utility of the five preceding tables.

In the series of prices from which the general average lists have been made, it must be remembered that all manner of allowances have been considered, as regards the items described; but where it occurs that such or similar works are *circular*, or *circular circular*, then, and in all such cases, according to the quickness of the curvatures, the prices must be increased in proportion to the *ratios* of difficult or intricate workmanship, progressively increasing from one-third to two-thirds and upwards in advance for labour, and in equal degrees for the value of the materials, which in the progress and execution of such works is unavoidably wasted. Allowances to be considered in valuing circular works.

Wainscot doors, that is, doors made of that sort of wood, commonly called *wainscot*, or Dutch oak, should be valued according to the same principle as deal doors, taking the prime cost of the wood as a *data* to commence with. The same must also be observed with respect to mahogany, satin, and other choice woods, with reference, also, to the goodness and neatness of the workmanship; and as the time occupied in making such articles entirely depends on the designs furnished for the purpose, detailed accounts should be kept of the men's wages, in order that suitable prices may be added to the value of the wood, which may then be very easily ascertained by admeasurement. Accounts to be kept of the prime cost of wainscot, mahogany, satin, and other fancy doors.

On Day-Work.

WHEN it is understood that Carpenters and Joiners works are not to be measured, the only way in which the tradesman can make out his claim is to prefer a day account, specifying in general terms the works that have been performed by the several workmen, whose time is usually charged and compounded with the materials which have been consumed. To a considerate mind it would The practice of making out day accounts.

Most open practice recommended to prevent disputes.

appear that objections could not be raised to this apparent and most rational mode of delivering in accounts; but as bills of this sort are frequently put together in a very unsatisfactory way, disputes often arise; and where it is possible the works are subsequently measured, and the accounts annalysed by investigators, at a considerable expense. It is, therefore, to be regretted that our friends in the building profession do not, upon all occasions, keep and send in copies of their accounts in the most clear and intelligent manner, making distinct charges against EACH ITEM; which system, if adopted, it is presumed, would prevent many very unpleasant disputes.

THE

AVERAGE PRICES

OF

MASTER CARPENTERS' AND JOINERS' WORKS,

WHEN CLAIMED IN DAY-BILLS.

		s.	d.
Day's work.	CARPENTER or Joiner, in London and its environs, per day*	6	6
	Do. for a single hour	0	6½
	Do. if in the country, but according to the local wages, and in proportion thereto.		
For timber.	Best Memel timber, per foot cube	4	0
	Do. Dantzic Riga	4	0
	Do. best American	3	6
	Do. inferior	3	0
10-feet deals, each at.	10-feet 3-inch yellow deals, when at £39. per hundred, each at	8	5¼
	2½-in. do.	7	1
	2-in. do.	5	8¾
	1½-in. do.	4	4½
	1¼-in. do.	3	9
	1-in. do.	3	0½
	¾-in. do.	2	4
	½-in. do.	1	8
	If 12 ft. or 14 ft., add ⅕th or ⅖ths. to the above prices.		
Deal, per foot run.	3-inch deal, per foot run, when at £39. per hundred	0	10¼
	2½-in. do.	0	8½
	2-in. do.	0	6¾
	1½-in do.	0	5¼
	1¼-in. do.	0	4½

* This charge is made under the impression of Journeymen's wages being 5*s.* 6*d.* per day; which, in our opinion, ought never to be less in the metropolis, to men who are meritorious, sober, industrious, and well-conducted.

	s.	d.	
1-inch deal, per foot run, when at £39. per hundred	0	3	
$\frac{3}{4}$-in. do.	0	$2\frac{3}{4}$	
$\frac{1}{2}$-in. do.	0	2	
10-feet 3-inch deal, per foot super, when at £39. per hundred	1	$1\frac{1}{2}$	10-feet deals per foot super
$2\frac{1}{2}$-in. do.	0	$11\frac{1}{4}$	
2-in. do.	0	9	
$1\frac{1}{2}$-in. do.	0	7	
$1\frac{1}{4}$-in. do.	0	6	
1-in. do.	0	$4\frac{3}{4}$	
$\frac{3}{4}$-in. do.	0	$3\frac{3}{4}$	
$\frac{1}{2}$-in. do.	0	$2\frac{1}{2}$	
Use and waste of fir timber, at per foot cube	1	4	Use and waste of timber.
Do. deals, in the same proportion, one-third.			
4-inch wrought-iron butt-hinges and screws, per pair, *3d.* per inch	2	0	Butt hinges.
$3\frac{1}{2}$-in. do. do.	1	9	
3-in. do. do.	1	6	
$2\frac{3}{4}$-in. do. do.	1	$4\frac{1}{2}$	
$2\frac{1}{2}$-in. do. do.	1	3	
$2\frac{1}{4}$-in. do. do.	1	$1\frac{1}{2}$	
2-in. do. do.	1	0	
$1\frac{3}{4}$-in. do. do.	0	$10\frac{1}{2}$	
$1\frac{1}{2}$-in. do. do.	0	9	
2-inch wrought-iron back flap-hinges and screws, per pair, at *3d.* per inch	1	0	Back flap-hinges.
$1\frac{3}{4}$-in. do. do.	0	$10\frac{1}{2}$	
$1\frac{1}{2}$-in. do. do.	0	9	
$1\frac{1}{4}$-in. do. do.	0	$7\frac{1}{2}$	
1-in. do. do.	0	6	
12-inch wrought-iron HL-hinges and screws, at per pair, $1\frac{1}{2}$*d.* per inch	3	0	HL-hinges.
10-in. do. do.	2	6	
9-in. do. do.	2	3	
8-in. do. do.	2	0	
7-in. do. do.	1	9	
6-in. do. do.	1	6	
5-inch wrought-iron parliament-hinges, with screws, at per pair, *3d.* per inch	2	6	Parliament-hinges.
$4\frac{1}{2}$-in. do. do.	2	3	
4-in. do. do.	2	0	
$3\frac{1}{2}$-in. do. do.	1	9	
4-inch cast-iron butt hinges, with screws, at per pair, $2\frac{1}{2}$*d.* per inch	1	8	Cast butt-hinges.
$3\frac{1}{2}$-in. do. do.	1	$5\frac{1}{2}$	
3-in. do. do.	1	3	
$2\frac{3}{4}$-in. do. do.	1	$1\frac{3}{4}$	
$2\frac{1}{2}$-in. do. do.	1	$0\frac{1}{2}$	
$2\frac{1}{4}$-in. do. do.	0	11	
2-in. do. do.	0	10	
$1\frac{3}{4}$-in. do. do.	0	$8\frac{3}{4}$	
$1\frac{1}{2}$-in. do. do.	0	$7\frac{1}{2}$	
$1\frac{1}{4}$-in. do. do.	0	$6\frac{1}{4}$	

		s.	d.
Cast back flap-hinges.	2-inch cast-iron back flap-hinges, with screws, per pair, $2\frac{1}{2}d.$ per inch ..	0	10
	$1\frac{3}{4}$-in. do. do.	0	$8\frac{3}{4}$
	$1\frac{1}{2}$-in. do. do.	0	$7\frac{1}{2}$
	$1\frac{1}{4}$-in. do. do.	0	$6\frac{1}{4}$
Cast parliament-hinges.	$4\frac{1}{2}$-inch cast-iron parliament-hinges, with screws, per pair $2\frac{1}{2}d.$ per inch	1	$10\frac{1}{2}$
	4-in. do. do.	1	8
	$3\frac{1}{2}$-in. do. do.	1	$5\frac{1}{2}$
Brass butt-hinges.	$2\frac{1}{2}$-inch brass butt-hinges and screws, per pair, $4d.$ per inch	1	8
	2-in. do. do.	1	4
	$1\frac{3}{4}$-in. do. do.	1	2
	$1\frac{1}{2}$-in. do. do.	1	0
	$1\frac{1}{4}$-in. do. do.	0	10
	1-in. do. do.	0	8
	$\frac{3}{4}$-in. do. do.	0	6
Flush-bolts.	30-inch brass flush-bolts and screws, at per inch $2d.$	5	0
	24-in. do. do.	4	0
	20-in. do. do.	3	4
	18-in. do. do.	3	0
	16-in. do. do.	2	8
	14-in. do.	2	4
	12-in. do. do.	2	0
	10-in. do. do.	1	8
	8-in. do. do.	1	4
	6-in. do. do.	1	0
	5-in. do. do.	0	10
	4-in. do. do.	0	8
	3-in. do. do.	0	6
Rod-bolts.	10-inch bright iron rod-bolts, with screws, at per inch $1\frac{3}{4}d.$	1	$5\frac{1}{2}$
	9-in. do. do.	1	$3\frac{3}{4}$
	8-in. do. do.	1	2
	7-in. do. do.	1	$0\frac{1}{4}$
	6-in. do. do.	0	$10\frac{1}{2}$
	5-in. do. do.	0	$8\frac{3}{4}$
	4-in. do. do.	0	7
Barrelled-bolts.	12-inch iron barrelled-bolts, with screws, $2\frac{1}{2}d.$ per inch	2	6
	10-in. do. do.	2	1
	9-in. do. do.	1	$10\frac{1}{2}$
	8-in. do. do.	1	8
	7-in. do. do.	1	$5\frac{1}{2}$
	6-in. do. do.	1	3
Iron rod-bolts.	10-inch iron rod-bolts, with screws, at $1\frac{1}{2}d.$ per inch	1	3
	9-in. do. do.	1	$1\frac{1}{2}$
	8-in. do. do.	1	0
	7-in. do. do.	0	$10\frac{1}{2}$
	6-in. do. do.	0	9
	5-in do. do.	0	$7\frac{1}{2}$
	4-in. do. do.	0	6

	s.	d.	
4-inch screws, at per dozen	0	11½	Screws.
3½-in. do. do.	0	10½	
3-in. do. do.	0	9½	
2½-in. do. do.	0	8½	
2-in. do. do.	0	7½	
1¾-in. do. do.	0	6½	
1½-in. do. do.	0	5½	
1¼-in. do. do.	0	4½	
1-in. do. do.	0	3½	
¾-in. do. do.	0	2½	
Two-shilling nails, per hundred	2	0	Nails.
Twenty-penny do.	1	8	
Ten-penny do.	0	10	
Eight-penny do.	0	8	
Six-penny do.	0	6	
Four-penny do.	0	4	
Three-penny do.	0	3	
Two-penny do.	0	2	
Spikes and holdfasts, at *5d.* per pound.			
2-inch iron pullies, *3d.* per inch	0	6	Pullies.
1¾-in. do. do.	0	5¼	
1½-in. do. do.	0	4½	
1¼-in. do. do.	0	3¾	
2-inch brass pullies, *6d.* per inch	1	0	
1¾-in. do. do.	0	10½	
1½-in. do. do.	0	9	
1¼-in. do. do.	0	7½	
Common sash-line, per yard	0	3	Sash-lines, &c.
Best do.	0	4	
Patent do.	0	6	
Cast-iron sash-weights, per lb.	0	2	
Lead do.	0	5	
Glue, per lb.	1	4	
White lead	0	8½	
Pitch	0	6	

Common stock-locks, are from 1*s.* 6*d.* each to 2*s.*, 2*s.* 8*d.*, 3*s.* 3*d.*, 3*s.* 9*d.*, 4*s.* 4*d.*, 5*s.* 5*d.*, 6*s.*, 7*s.*, 8*s.*, to 10*s.* and upwards. Common stock-locks.

Iron locks, with brass handles, are from 4*s.* 10*d.* each to 5*s.* 5*d.*, 6*s.* 6*d.*, 7*s.*, 8*s.*, 10*s.*, to 14*s.* and upwards. Locks with brass handles.

4-inch, 5-in., 6-in., and 7-in. iron-rim locks, are from 1*s.* 8*d.* each to 2*s.*, 2*s.* 6*d.*, 2*s.* 9*d.*, 3*s.*, and 3*s.* 6*d.* and upwards. Rim-locks.

8-inch, 9-in., 10-in., and 12-in. iron-rim drawback-locks, are from 7*s.* each to 8*s.*, 8*s.* 6*d.*, 9*s.*, 9*s.* 6*d.*, and 10*s.* and upwards. Rim drawback locks.

It is usual, in public works, to charge 15 per cent. profit on the prime cost of ironmongery, which is presumed to be a very fair allowance.

Observe.—Master-Carpenters and Joiners will be justified in charging two-pence-halfpenny in the shilling on the prime cost of wages paid to their men, Profits on wages.

provided those wages correspond with the average wages usually given, which, in London and its environs, may be considered at *5s. 6d.* per day, where the master may charge *6s. 6d.*, which will be only twenty per cent. profit.

Oak and elm timber.

As English, Irish, and American oak, with elm, Dutch wainscot, and the different sorts of Spanish mahogany, are in constant use in Carpenters' and Joiners' works, it will be necessary to give some account of these different sorts of wood, for the information of those who are not particularly conversant in building.

English and Irish oak.

British and *Irish Oak*, both of which are highly appreciated, may be considered, with few exceptions, as at the same price in every part of the kingdom; and in those parts where the growth of it is encouraged, the price will be found nearly the same as the best fir timber imported into these countries for the purposes of building: its qualities, however, for general uses, are not held in the same estimation, for although more durable, it is not calculated for roofing, flooring, and numerous other purposes which could be adduced, in consequence of its liability to swag, which is invariably the case where the greatest precautions are not taken by superabundance of trusses and struts, which not only tend to incumber, but to distress, the internal and external walls by unnecessary weights. Oak, however, is well known to be a wood very useful, judiciously introduced in public and private edifices, and will for ever be esteemed in these countries for its general utility, but more especially for ship-building. The price of English oak, in London, is about *one-third* dearer than the best foreign timber, and may be estimated, in reference to Table, No. 9, at twice the prime cost of fir timber in that table.

Oak to be avoided in roofing.

Ship-building.

Oak in London.

American oak.

American oak is inferior to our English or Irish timber of the same sort: it is imported in a desirable state to manufacture, being nearly dye-square, and is found very useful for general purposes, and the price may be estimated in the metropolis, or at any of our sea-ports in England, Ireland, and Scotland, in reference to Table, No. 8, at double the prime cost of fir timber, with the profit thereon.

Elm timber

Elm Timber.—This favourite of English soil is not less entitled to our consideration than the valuable oak: under water it is superior to the latter; and hence it is, that the keels of our ships are made with that material, which, for a variety of useful purposes, cannot be surpassed by any other species of wood known to grow in these countries. It is, however, seldom used in any but inferior buildings, and when introduced may be estimated, in reference to Table, No. 12, when the prime cost of fir timber is at *4s.* per foot.

seldom used in building.

Dutch wainscot.

Dutch Wainscot.—This wood may be properly called Dutch oak: it is the same species of wood as our English or Irish timber before described, but of a lighter quality, and the grain of the wood far more interesting, insomuch as it induces manufacturers, in many parts of the kingdom, to convert it into articles of household-furniture, which, in the castellated mansion, and the *cottage orneé*, is extremely appropriate.

Beautiful furniture made with this wood.

Wainscot-sashes.

In our modern buildings, Dutch oak, or *wainscot*, is made use of for various purposes, but chiefly in sashes of different descriptions, and in cabinet-work appropriated for libraries, morning-rooms, and reading-rooms: it is therefore classed with mahogany, being, on most occasions, substituted for that material, and may be estimated, in reference to Table, No. 12, at three times the prime cost of fir timber.

Mahogany. — This choice and valuable wood is also very frequently used in finishing buildings; it is the produce of the West-Indies, and is imported into Europe in logs of considerable bulk, the intrinsic value of which entirely depends upon the grain of the wood, which cannot be discovered until it has been opened or sawn asunder; it is therefore impossible to communicate decisive opinions, as to the appreciation of it, in any other way than by stating, in general terms, that *mahogany, fit for the purposes usually applied in buildings,* is about five times the prime cost, value of fir timber, in Table, No. 12.

Mahogany, produce of the W. Indies.

Qualities discovered when sawn.

English oak, in reference to Table, No. 9.

	s.	d.
English or Irish Oak Timber may be charged in day-bills, in great and small scantlings, at twice the prime cost of fir timber, in Table, No. 9, which will be, at per foot cube	6	5
½-inch oak plank, at per foot super	0	4
¾-in. do. do.	0	6
1-in. do. do.	0	8
1¼-in. do. do.	0	10
1½-in. do. do.	1	0
2-in. do. do.	1	4
2½-in. do. do.	1	8
3-in. do. do.	2	0

American oak, in reference to Table, No. 8.

	s.	d.
American Oak Timber may be charged in day-bills, in great and small scantlings, at twice the prime cost of fir timber, in Table, No. 8, which will be, at per foot cube	5	10½
½-inch American oak plank, at per foot super	0	3¾
¾-in. do. do.	0	5½
1-in. do. do.	0	7¼
1¼ in. do. do.	0	9¼
1½-in. do. do.	0	10¼
2-in. do. do.	1	2½
2½-in. do. do.	1	6¼
3-in. do. do.	1	10

Elm timber, in reference to Table, No. 12.

	s.	d.
Elm Timber may be charged in day-bills, in great and small scantlings, at the prime-cost of fir timber, in Table, No. 12, which will be, at per foot cube	4	0
½-inch elm plank, at per foot super	0	2¾
¾-in. do. do.	0	4
1-in. do. do.	0	5½
1¼-in. do do.	0	6¾
1½-in. do. do.	0	8
2-in. do. do.	0	11
2½-in. do. do.	1	1¼
3-in. do.	1	4

Dutch wainscot, in reference to Table, No. 12.

	s.	d.
Dutch Wainscot.—The following prices may be charged for this sort of wood, reckoning the value at about three times the prime cost of fir timber, in Table, No. 12, which will be, at per foot cube	12	0

		s.	d.
Wainscot.	½-inch Dutch wainscot, at per foot super	0	6¾
	¾-in. do. do.	0	10
	1-in. do. do.	1	1½
	1¼-in. do. do.	1	4¾
	1½-in. do. do.	1	8½
	2-in. do. do.	2	3
	2½-in. do. do.	2	9½
	3-in. do. do.	3	4½
Mahogany.	The average value of good Spanish Mahogany (so called from being imported from a Spanish colony) may be estimated at about £1. per foot cube, supposing the quality equal to what is required for common building purposes, which will regulate the following prices, at about five times the average prime cost of fir timber, in TABLE, No. 12, which will be, at per foot cube	20	0
Mahogany, in reference to Table, No. 12.	½-inch mahogany, at per foot super, with sawing	0	11
	¾-in. do. do.	1	4½
	1-in. do. do.	1	10
	1¼-in. do. do.	2	3½
	1½-in. do. do.	2	9
	2-in. do. do.	3	8
	2½-in. do. do.	4	7
	3-in. do. do.	5	6

ON SASHES, SASH-FRAMES, FRENCH CASEMENTS, SKY-LIGHTS, &c. &c.

Sashes, fixed and hung. SASHES are sometimes fixed, but, for the most part, they are single or double hung, or else made to slide; when fixed, they are usually in shop-windows, or prepared to fit apertures left for the purpose of admitting light, at the same time, by being glazed, excluding the inclemencies of the weather; but, without good reasons to the contrary, sashes, in rooms and staircases, &c. should, on all occa- *Ventilation by double hanging.* sions, be double hung, for the purpose of ventilation; for it is well known, that fresh air rushes in at the bottom, and that the foul air escapes at the top: the *Experiment to prove, by a lighted candle, the current of foul and fresh air.* truth of which may be proved, by placing a lighted candle at the bottom of a room door-way; and, at the same time, holding another candle at the top of the same aperture, on making this experiment, it will be presently observed that, by the pressure of the fresh air, the blaze from the candle at the bottom will be impelled inwards; and that, by the contrary pressure of the foul air, making its escape at the top, the blaze of the uppermost candle will be impelled outwards; this experiment being proved, we presume it will be sufficient to con- *Room and staircase windows.* vince any man of common understanding that windows, in rooms and staircases, &c., on all occasions, should be double hung, where the health of our fellow-subjects is taken into consideration. We hope, therefore, in future, that in all *Windows in modern edifices.* our modern edifices, whether public or private, that the principle of fixing either the upper or lower sashes, except in cases of necessity, will be done away, and this hope is the more ardently entertained from the conviction that fevers, of the worst description, are frequently generated and increased in our apart-

ments, not only in public but private dwellings, by the want of a regular system of ventilation.

Sashes are of various descriptions, and are made of different sorts of wood, generally with clean yellow deal, but frequently with mahogany and wainscot, each of which materials are well suited for the purposes mentioned. Sashes made of deal, of the best quality, are much appreciated, but they are not equal to those which are made of wainscot or mahogany, nor are they so expensive. Wainscot sashes are next, in point of worth, to those made of deal, and on the average may be estimated at double the value, and mahogany at nearly three times, if made with wood of the best sort. Sashes, various sorts.

To ascertain the intrinsic value of sashes, the quantity and quality of the materials should be computed by dissected admeasurements, abstracted for the purpose, in order to shew the relative quantities, in reference to the qualities, as in the manner heretofore described upon the subject of doors; and, having found, by similar means, the quantity of materials in a sash, or number of sashes, the next step to be taken should be, to calculate the value of such materials by the prime cost tables, in order that such valuations of the materials may be guides to commence with: the next step to be taken should be, to find the *average* value of the labour, by reference to the comparative degrees of time, that men of ordinary abilities would take to perform the same quantities of work; having computed the value thereof, the same should be added to the value of the materials: then proceed to measure the superficial contents of such sash or sashes; which, being known, then say, if so many feet cost the sum ascertained, what will one foot cost? which being computed, you will obtain the *desideratum*, to which must be added 20 *per cent.* profit, with the labour of hanging or fixing, as the case may be. How to value sashes. Materials, and number of squares. Prime cost tables. Labour on sashes. Superficial contents. What will one foot cost.

It must, however, be observed, that, although the before mentioned is the only system which can be adopted to arrive at the real value of the articles in question, yet it must be recollected that sashes are of various sizes; that the squares, as they are called, are of all manner of dimensions, in reference to different proportioned windows; consequently, the quantity of materials must be constantly at variance with any presumed standard: of course the prices of sashes will be found to vary, according to circumstances, in the same ratio, as the sizes of windows, or quantities of materials which may be consumed in different proportioned sashes; the only information, therefore, which can be safely conveyed in a work of this sort, is, to communicate average lists, leaving valuators to exercise their mental faculties, in finding out such prices, at intermediate times, or under any circumstances whatever, but always in reference to the qualities of the materials and the workmanship. Only system to be adopted. Squares of various sizes. Price must vary according to sizes. Proportions of sashes. Average prices. Valuator to exercise discretion.

French casement-sashes, or what may be more properly called sash-doors, differ materially from sash-windows, which are hung in the ordinary way, inasmuch as they are made to hang horizontally, and to turn one-quarter, or one-half, round, upon butt or pivot hinges; yet the workmanship may be considered nearly equal, including the extra work which is necessary in forming the requisite appurtenances, by rebating, grooving, tongueing, and beading, the middle and external, as well as top and bottom, rails. The squares, in the last description of sashes, are, in general, larger than those which are hung with weights, French casements; principle of hanging them, &c. Rebates and grooves.

Squares to French casements larger than common sashes.

lines, and pullies; but the quantities of wood consumed in them is not less, as the external rails are necessarily wider, than the description of sashes last alluded to.

Circular sashes double price.

Circular sashes; that is, sashes made for semicircular apertures over doors and windows, are worth, at least, double the value of square sashes, and should be estimated accordingly: it is, however, the custom with some valuators to embrace in the admeasurement of circular-headed windows, all that appertains to such windows as being circular: it is true, the value may be ascertained correctly by these means, but the principle is not good, for reasons which must be obvious; the best way is to value the circular and square parts separately, that each description of work may be recognized by its proper description, or subsequent valuation.

Practice of Valuators.

Sky-lights, how to value.

The value of common sky-lights should be also ascertained in the manner already described: and, having now travelled through the article of sashes, it is presumed we have given as much information upon this part of our subject as can be required.

Sash-frames.

Hollow sash-frames.

Sash-frames are either solid or deal cased: in the latter case they are made hollow, for the purpose of containing the weights and affixing the pulley-pieces thereto, that the sashes may be suspended by lines, and counterpoised by means of cast-iron or leaden pendants, equal to or superior to the weights of the sashes and glass; by which means the sashes may, with facility and safety, be raised up and pulled down. The weights, or pendants, are secreted in the hollow casings with closed apertures, which may be easily taken out and replaced when required, in order to regulate the weights and lines. The heads of these descriptions of frames are nearly the same as their perpendicular sides, but the sills are invariably made solid, of fir or oak, single or double sunk, to throw off the wet upon the stone sills, strings, or belting courses, which, on all occasions where introduced, should be throated to prevent the water trickling down the faces of the walls.

Weights, lines, and pullies.

Weights may be rectified.

Heads of sash-frames.

Solid sills, single or double sunk.

How to value sash-frames.

To compute the value of sash-frames of the description before mentioned, by the *foot superficial*, it will be necessary to proceed in the same manner as recommended in similar instances; that is, by analysing all the component parts, consisting of the deal casings, the external beads, the parting beads, the parting slips, the pulley-pieces, the heads and sills, and whatever appertains to the frame, a detailed bill of the several parts being made, the total amount, with twenty per cent profit thereon, will be the intrinsic value; but, as the ulterior object of such valuations is intended to show the value per foot superficial, of such sort of frames, the lengths and breadths thereof should be taken, and duodecimally multiplied, the product of which will be the superficial contents: then say, if the number of feet or inches contained in the said frame or frames are worth the amount of the detailed bill of component parts, what will be the worth of one foot superficial measure? which, being ascertained, will be a nominal standard price for frames of the description alluded to; but where they are all different in denomination, the same operation must be repeated *ad infinitum*, not only with reference to deal cased-frames, but also to deal and oak solid frames, where the qualities and quantities of workmanship and materials are at variance with the prices which have been, from time to time, regulated according to local

Superficial feet in frames, arithmetically valued.

Nominal standard price.

Cased and solid frames.

usages, or by any peculiar standard which may have been made to suit particular districts. From hence, it is evident, that fixed or standard prices cannot be universally supported for sashes or frames, or for any other description of work, which must entirely depend upon the component parts being of the same denomination, and the prime cost of the materials being different at sundry places. It is true these variations or aberrations from general customs seldom occur; nevertheless, it is the duty of valuators, on all occasions, to make their computations upon such uncontrovertible principles, that, if investigated, they may be able to prove the accuracy of their calculations.

On the duties of valuators.

When solid casement frames are made for French sashes, which open like folding doors, if the frames are valued by the foot superficial, the same principle should be adopted to find the value, as in the last instance; but we can see no reason why solid casement-frames should not be classed with fir proper door-cases, and charged at per foot cube, with additional prices for the extra labour in grooving, to receive the tongues let into the external rails of the sashes, as well as for the consequent superior degrees of workmanship in double sinking the solid oak sills, &c.

The same principle to be adopted with casement-frames.

The custom, in the metropolis, of valuing sashes and frames in superficial feet, is not generally approved; inasmuch as the usual charges thereon convey wrong notions: yet the principle is correct, but not easy to be reconciled. For what, in appearance, can be more at variance with common sense, than to raise fictions for the purpose of reasoning upon facts? Nevertheless, we know this to be the case, and, *without* the fear of being contradicted, it is stated that the value of sashes and frames discovered, by the means hereinbefore explained, is accurate; although apparently inconsistent, the mode of arriving at the truth is circuitous, and might be remedied. However, as the most scientific architects, as well as surveyors, have sanctioned the custom alluded to, it might perhaps be considered *presumptuous* to attempt to set aside the custom in question, which has been ratified by the approbation of eminent men for ages past.

Customs observed in London.

Sashes, fitted and hung, in reference to the Prime Cost of Deals, &c. when at £39. per Hundred, per Foot Super.

	s.	d.	
2-inch deal ovolo sashes	0	10	2-inch deal sashes.
Do. circular headed	1	6	
Do. circular on the plan only	1	2	
1½-inch deal straight ovolo and astragal sashes	0	9	1½-inch deal sashes.
Do. circular headed	1	4	
Do. circular on the plan only	1	0½	
2-inch ovolo wainscot sashes	1	2	2-inch wainscot sashes.
Do. circular headed	2	2	
Do. circular on the plan only	1	8	
2-inch ovolo mahogany sashes	1	8	2-inch mahogany sashes.
Do. circular headed	3	3	
Do. circular on the plan only	2	6	
1½-inch deal square fan-lights, fixed	0	9	Fan-lights.
Do. with semicircular heads	1	5	

Designs for sashes and frames, and how to value them.

If at any time descriptions of sashes should be introduced which are thicker than those we have described, or should be worked to different patterns, they should be estimated accordingly; and, if circular on the plans, as well as in the elevations, the prices should be trebled. The designs for sashes and frames are so numerous, that it would be almost impossible to construct, or to contemplate, prices which can or could have reference to them; but with the instructions we have communicated, it is presumed that any man of moderate talent, and with ordinary application, may compute prices suited to every description, not only of sashes but of frames, including pulley-pieces, lines, and weights, &c., of every and each denomination.

French Casement Sashes, &c. per Foot Superficial, in reference to the Prime Cost of Deal, when at £39. per Hundred.

		s.	d.
Deal casement sashes.	$2\frac{1}{2}$-inch deal ovolo casement sashes	1	4
	2-in. do.	1	2
	$1\frac{1}{2}$-in. do.	1	0
Wainscot do.	$2\frac{1}{2}$-in. wainscot do.	2	0
	2-in. do.	1	8
Mahogany do.	$2\frac{1}{2}$-in. mahogany do	2	8
	2-in. do	2	2

Sky-lights, per Foot Superficial.

		s.	d.
2-inch oak sky-lights.	2-inch oak champhered sky-lights	1	2
	Do. to an irregular plan	1	4
	Do. hipped	1	10
2-inch deal sky-lights.	2-inch deal ovolo sky-lights	0	11
	Do. to an irregular plan	1	0
	Do. hipped	1	7
	$1\frac{1}{2}$-inch deal ovolo sky-lights	0	9

Shop windows to be valued according to sizes of squares.

Sashes for shop-windows should be estimated according to the sizes of the squares; if they are large, the materials consumed will be considerably less than when they are small; and in the same ratio the labour will be reduced, as in proportion to the number of squares the labour increases, *ad infinitum;* and therefore the quality of the materials should be first ascertained, whether *deal, wainscot,* or *mahogany,* the intrinsic value of which, together with the value of the labour, and 20 per cent. profit, will be the honest value of shop sashes of each denomination, whether *straight, circular,* or *elliptical;* but if either of the latter, of course the value of the labour will be greater, in reference to the flatness or quickness of their curvatures, the value of which should be determined by the valuator, or else proved by the time consumed in making and fixing. Indefinite prices for works of this description, which refer to shop-windows, are particularly calculated to mislead those who are uninformed upon our subject; and therefore it has been deemed expedient to develope the proper way of arriving at the truth, which cannot fail to prove satisfactory to those in search of correct information.

Calculations in reference to windows.

Shop-windows governed by the same principles as sash windows.

What has been stated with respect to sash shop-windows, equally applies to all manner of sash-windows; for upon the sizes of the squares must depend the intrinsic value of the sashes. Upon a general view, therefore, it is evident that definite prices cannot be ascertained for sashes, which are as indefinite as the sizes of the openings they are made to occupy. Under these circumstances, the value of sashes should always be proportioned to the sizes of the squares, or to the number of them: for example, suppose an aperture, 8 feet high and 4 feet wide, was required to be fitted with 2-inch deal sashes, or made of wainscot or mahogany, and that the sashes were required to be *three* square wide and *four* square high; and that a similar aperture was required to be fitted with sashes of the same thicknesses, but *six* squares wide and *eight* squares high, would it not be absurd to charge both descriptions of sashes at the same price? Yet we know this to be the case, not only in London, but in many parts of the kingdom; and, under these impressions, we are of opinion that the custom alluded to, of valuing sashes in the manner described, is extremely inconsistent; and what can be more so, than to observe the value of sashes, estimated by references to their thicknesses, and not by the quantities of materials, or the value of the labour? And it is upon these principles of reasoning, as by the foregoing *exposè*, we venture to state, that the value of the two sets of sashes must be widely different, inasmuch as the value of the materials of the one set must be double the value of the other, and the value of the labour in the same proportion, of course the net value per foot superficial must be at variance, in the ratio of two to one. And considering the subject as regards the interest of the builder, when viewed upon an extensive scale, we have been induced to notice the custom, in the hope that hereafter equitable prices may be allowed, on all occasions, for sashes, consistent with the honest value of the work, as well as the correct average value of the materials.

Sashes to be estimated by the quantity of materials, and value of labour.

Average Value of Sash Frames, per Foot Super.

	s.	d.	
1-inch deal cased frames, with oak sunk sills for 2-inch sashes, with brass pullies, prepared to be double hung	0	11	Frames for 2-inch sashes.
Do. circular headed	1	11	
Do. circular on the plan only	1	5	
1-inch deal cased frames, with oak sunk sills for 1½-in. sashes, with iron pullies, prepared to be double hung	0	11	Frames for 1¼-inch deal sashes.
Do. circular headed	1	9	
Do. circular on the plan only	1	4	
1-inch deal cased frames, with oak sunk sills for 2-in. sashes, with wainscot pulley pieces, and beads and brass pullies, prepared to be double hung	1	4	Frames for 2-inch deal sashes.
Do. circular headed	2	7	
Do. circular on the plan only	1	11½	
1-inch deal cased frames, with oak sunk sills, mahogany pulley pieces and beads, including brass axle pullies for 2-inch sashes, prepared to be double hung	1	7	Frames for 2-inch deal sashes, with brass axle pullies, &c.
Do. circular headed	3	3	
Do. circular on the plan only	2	6	

		s.	d.
Sashes and frames, 2-inch deal sashes.	1-inch deal cased frames, with oak sunk sills, 2-inch deal ovolo sashes, double hung, with brass pullies, best white lines and iron weights, all complete	1	9
	Do. circular headed	3	5
	Do. circular on the plan only	2	7
Sashes and frames, 1½-in. deal sashes.	1-inch deal cased frames, with oak sunk sills, 1½-inch deal ovolo sashes, double hung, with iron pullies, best white lines and iron weights, all complete	1	7
	Do. circular headed	3	3
	Do. circular on the plan only	2	6
Sashes and frames, 2-inch wainscot sashes.	1-inch deal cased frames, with oak sunk sills, 2-inch wainscot ovolo sashes, double hung, with wainscot pulley pieces and beads, and brass pullies, best white lines and iron weights, all complete	2	7
	Do. circular headed	5	2
	Do. circular on the plan only	4	10
Sashes and frames, 2-inch mahogany sashes.	1-inch deal cased frames, with oak sunk sills, 2-inch mahogany ovolo sashes, double hung, mahogany pulley pieces and beads, including brass axle pullies, best white lines and iron weights, complete	3	9
	Do. circular headed	7	6
	Do. circular on the plan only	5	6

On Staircases.

On geometrical, circular, and elliptical staircases; how to value them.

In the multifarious articles on Joiners' works, there are none which require more judgement and penetration, as to valuation, than those about geometrical staircases, which are of various forms, but seldom or never of the same sizes, except in houses built in towns, finished in the same manner, and where what has been done in one or more instances may be guides for all the rest; but in public or private edifices of superior descriptions, where the staircases are frequently circular, elliptical, and of various complicated shapes, suited to the ingenuity of the plans, the several parts must, of course, vary in their dimensions and intricacy of workmanship, which will cause the value of the works to be more or less expensive in proportion to the quickness of their curvilinear shapes, or the sizes of the spaces they occupy.

How to value difficult parts.

Under these circumstances, indefinite prices for the intricate parts of staircases, which depend upon their various sizes, cannot be relied on. The valuator, therefore, must exercise his judgement in these, as well as in similar cases, by dissecting the component parts, in order that he may arrive at degrees of information, not to be attained by any other means. We are aware he will have to contend with difficulties, and frequently to depend upon

Intelligent artisans may be relied on.

second-hand information; but as the best description of our artisans may be relied on, little doubt is entertained that, in most cases, the truth may be obtained, both as regards the quantum of time and the materials, so that the principles of justice may be equitably administered, by the value of the works being honestly accounted for. The information conveyed upon this subject, it is presumed, will more than compensate for a series of doubtful calculations which cannot

afford the least satisfaction: such prices, however, as relate to staircases in general, are embodied in this work and are subsequently introduced; and which, with the aid of these instructions, will, it is presumed, diffuse as much general information as can be looked for in a Price-Book, written for the avowed purpose of elucidating the correct principles of ascertaining the honest value of every description of work appertaining to building, not only in the British metropolis, but in every part of the empire.

Prices for staircases embodied in this work.

The following are the general Description of Works alluded to in Staircases, at per Foot Superficial, &c.

	s.	d.	
$1\frac{1}{2}$-inch clean deal steps, risers, and carriages, with moulded fronts	2	10	Deal steps, risers, carriages, &c.
Do. second best do.	2	6	
Do. common steps, risers, and carriages	1	4	
Do. clean deal, dowelled, half spaces, and joists	3	8	
Do. second best do.	2	10	
$1\frac{1}{4}$-inch deal common steps, risers, and carriages, per foot super	1	7	Deal steps, risers, and carriages, per foot super.
Do. with moulded nosings, do.	1	8	
Do. curtailed at both ends, do.	2	0	
Do. second best deal moulded nosings, do.	2	4	
Do. clean deal, do.	2	8	
$1\frac{1}{4}$-inch deal plain string board, framed in newels, planed two sides, and capped, do.	1	1	String-boards.
$1\frac{1}{2}$-in. do. do.	1	2	
Do. single sunk and beaded, do. do.	1	4	
Do. double sunk and beaded, do.	1	5	
Do. architrave string-board, do.	1	6	
3-inch deal square newels, capped, per foot run	0	$5\frac{1}{2}$	Newels, per foot run.
Do. turned do. do.	0	9	
$3\frac{1}{2}$-inch deal square do. do.	0	7	
Do. turned do. do.	0	$10\frac{1}{2}$	
4-inch square do.	0	$10\frac{1}{2}$	
1-inch deal square bar balusters	0	$2\frac{1}{2}$	
Do. dovetailed	0	$3\frac{1}{2}$	
Turned pendants to newels, each at	0	6	
Do. turned and mitred caps to newels	1	4	
Deal turned columns, of larger dimensions than the above newels, to be paid for in proportion to their sizes.			
$1\frac{1}{4}$-inch plain deal brackets, with moulded nosings, ordinary size, each at	1	0	Brackets, &c. each at.
Do. cut mitred brackets and nosings to stairs, do.	1	8	
Do. scroll brackets, do.	2	0	
Plain cut brackets and nosings to steps, do.	1	10	
$2\frac{1}{2}$-inch deal framed cut brackets, moulded, do.	1	11	
Circular do., with moulded nosings, do	1	10	
Straight moulded deal hand rail, per foot run	1	2	
Deal moulded hand-rail, ramped and knee'd, per foot run	3	3	

		£.	s.	d.
Deal hand-rails.	Deal circular hand-rail, ramped and knee'd, per foot run.	0	4	4
	Do. twisted and ramped, do.	0	6	0
Mahogany hand-rails.	4-inch mahogany moulded hand-rail, straight, do.	0	3	6
	Do. ramped and knee'd, do.	0	7	0
	Do. twisted do. do.	0	10	0
3-inch do.	3-inch mahogany moulded hand-rail, straight, do.	0	3	3
	Do. ramped and knee'd, do.	0	6	6
	Do. twisted do. do.	0	9	9
3-inch circular &c.	Do. circular or oval, glued up in the thicknesses to a regular circle or oval plan, the top or rail cross banded, do.	0	16	0
	Do. to an irregular plan, the rails cross-banded, do.	0	19	0
3-inch oval, &c.	Circular or oval mahogany hand-rail, glued up in thicknesses to a regular circle or oval, with veneers to correspond, the top rail cross-banded, with the best wood, do.	1	2	0
	Do. to an irregular plan, do.	1	5	0

Observe.—All manner of deal turned balusters should be charged according to their lengths and thickness, at per dozen, the value of the material being first ascertained; and, likewise, that, for all manner of circular work, double measure or double prices must be allowed; and that, where the work is of a peculiar description, requiring more than double the labour, then an extra price should be allowed in proportion thereto.

On Cradlings and Bracketings.

Cradlings to coved cornices, &c.

This description of works consist in a series of pieces, of inch, inch-and-quarter, or inch-and-half deals, cut into divers shapes, for the purposes of forming coved cornices, ceilings, groins to passages, cornices to shop-fronts, and for various purposes. And it is possible the prices may be nearly ascertained in superficial feet, under the idea that the several pieces above described are about twelve inches apart; consequently, the value of the materials may, in certain degrees, be arrived at, by supposing the facts as stated; but it is impossible, after the works are secreted, to determine with accuracy the quantities of materials which have been consumed. The valuator must, therefore, as in similar instances,

How to value them.

exercise his sound discretion and judgement by working problems and calculations, the result whereof is to satisfy himself; first, upon the value of the materials; and, secondly, on the labour which may be accomplished, by raising fictions

Conscience to be regulated by principle.

correspondent with the former, so that he may, by degrees, discover settled and conscientious prices, without doing violence to his feelings. We must admit that the system pointed out is, like many others, unsatisfactory; but as it is the only rational method which can be pursued, under valuations by admeasurements, it is presumed a better remedy cannot be suggested, than by admitting the charges for such works in day-bills, which may be always satisfactorily proved, where accurate daily accounts are kept of the prime cost of workmen's wages, and the materials that have been consumed; but when the plan alluded to is not adopted, then the following prices may be allowed, or others assimilating thereto may be established.

General average Prices of Cradling, in reference to Table, *No.* 10.

	s.	d.	
$1\frac{1}{4}$-inch deal cradling to entablatures, per foot superficial	0	11	Cradling to entablatures, cornices, &c.
Do. in cove-bracketing, in 2-inch thickness	1	0	
Do. to common cornices	0	7	
Do. circular do.	0	11	
Do. modillion and block cornices	0	9	
Do. circular do.	1	1	
Do. to groins	1	5	

On Deal Mouldings.

To commence with the valuation of deal mouldings, at *per foot* running measure, it will be necessary, in the first place, to consider their breadths and thicknesses, in reference to the value of the materials; for, although the price thereof may be considered comparatively small, yet it is the first object to be taken into consideration in the formation of prices. In the valuation, therefore, of mouldings, the Tables must be consulted to ascertain the value *per foot* run of slips of deal, according to the breadths and thickness of the mouldings proposed to be valued, in order that the intrinsic value of the materials may form the basis of the valuation; to which must be united the value of the labour, to be proportioned to the difficulty, neatness, and goodness, of the workmanship. Now, to exemplify what has been stated, let us suppose that the value of a moulding, 3 inches wide and $1\frac{1}{2}$ inch thick, is required: first, look into Table, No. 10, and ascertain what is the value of $1\frac{1}{2}$-inch deal, at per foot run, 9 inches wide, and, upon examination, it will prove to be $5\frac{1}{4}d.$: then, as 3 inches is the third of *nine*, the value of the materials for the proposed moulding will be the third of $5\frac{1}{4}d.$, which, being divided by *three*, the product will be $1\frac{3}{4}d.$, the value of the materials *per foot run*, to which must be added the value of the labour and the profit thereon, which will be equal to the value of the materials, making the total value of the moulding $3\frac{1}{2}d.$ *per foot run*, to which one halfpenny may be added for profit.

Deal mouldings, how to value. Prime cost of materials. Breadths and thickness. Reference to Table, No. 10.

Deal, as well as all sorts of wood, mouldings, are of various shapes and sizes, and are introduced, where required, about the panels of doors, linings, window-shutters, architraves, bases, surbases, and all manner of joiner's works, to ornament the different parts of rooms, passages, staircases, &c.; and mouldings are likewise introduced in combinations to form cornices to apartments, as also to chimney-pieces, internal and external door-cases, in the composition also of bases and capitals, to columns and pilasters, with their respective entablatures. Nor are they less conspicuously introduced in every instance, where good sense and taste prevails in the distribution of modern joinery.

Shapes and sizes of mouldings. Applications of them in bases, capitals, and columns;

The value of mouldings, which are intermixed in cornices, accompanied with different square members, should be ascertained by the foot superficial; but where they are wrought in single mouldings, and fixed separately, then it is customary to value them by the foot running measure; in either case, however,

Valued by the foot run and superficial.

Talent and ingenuity.

the same principle of arriving at the value is recommended, which has been heretofore explained, always keeping in view the ingenuity, talent, and taste, which may have been displayed in the execution of the work.

Quirk, ovolos, ogees, &c. &c.

Common ovolos, quirk ovolos, common ogees, and quirk ogees, are the description of mouldings, which are the most in use; but, besides these, the following may be enumerated: the two cymas, inverse and reverse, the torus, the scotia, the cavetto, the astragal, and the bead, each of which, together with the annulets or square fillets, which separate the mouldings, may be considered as legitimate architectural mouldings, inasmuch as their origin can be traced from antient Greek and Roman authorities; but, independent of those we have mentioned, numerous mouldings have been subsequently invented which appertain to the different styles of our national architecture; and where they are introduced, as in Gothic, Saxon, and castellated buildings, the workmanship should be valued in proportion to the difficulties, and the materials according to their quantities and qualities, in reference to their breadths and thicknesses, if valued by the foot running measure; but if superficially, then in reference to the superficial prime cost, per feet. Considerable pains have been taken to explain the minutiæ of arriving at the value of moulded work, and this trouble has been taken with pleasure, in the hope that the subject may be thoroughly comprehended.

Saxon and Gothic mouldings.

Superficial prime cost.

Average Prices of Mouldings, &c. at per Foot Run, and Cornices, at per Foot Superficial.

		s.	d.
Deal mouldings, &c. per foot run.	Common ogee and ovolo mouldings, including fillets and beads, 3 inches wide and 1½-inch thick, per foot run	0	4
	Do. quirk ogee, and ovolo mouldings, do.	0	5
	Common ogee and ovolo mouldings, &c. 2½-in. wide and 1¼-in. thick, do.	0	4
	Do. quirk ogee, and ovolo mouldings, do.	0	4½
Common ogee mouldings, &c.	Common ogee and ovolo mouldings, &c. 2-in. wide and 1¼-in. thick, do.	0	3½
	Do. quirk ogee, and ovolo mouldings, do.	0	3
	Astragals and fillets on each side, mitred to panels of doors, do.	0	3½
	Do. to shutters, do.	0	3

Circular-headed doors.

Observe.—If any of the above mouldings are applied to circular-headed doors and windows, the prices should be double; but if only circular on the plan, then one-half, or more, in proportion to the quickness of the curvatures. Mouldings of every description may be charged in the same ratio.

		s.	d.
Average prices of mouldings, per foot superficial.	Deal level strait mouldings out of 1½-inch deal, consisting of double sunk architraves, bases, surbases, and cornices, &c. per foot super	1	6
	Do. in raking cornices out of 1½-in. deal, do.	1	8
	Do. where the breaks and mitres are numerous, do.	2	0
	Do. in circular cornices, where the curves are flat, do.	2	6
	Do. in circular cornices, where the curves are sharp, do.	3	6
Circular cornices.	Do. in small curves, which are semicircular, do.	4	0
	Do. in double sunk architraves to windows, which are semicircular, do.	4	6
Pilasters.	2-inch deal reeded pilasters, straight, do.	1	10
	Do. circular on the plan, do.	2	6

	s.	d.	
Strait mouldings, mitred, to bases and capitals of pilasters, out of 2-inch deal, at per foot super	1	10	
Circular mouldings to bases and capitals of columns, out of $2\frac{1}{2}$-in. deal turned, do.	3	8	Circular mouldings.

Modillions to Ionic and Corinthian cornices to be valued according to their sizes; also the mutules, triglyphs, and bells, in Roman and Grecian doric entablatures: the sizes of which being indefinite, of course prices, in reference thereto, would be inconsistent. Mutules, &c.

	s.	d.	
Aris-flutings to pilasters, $1\frac{1}{2}$-in. wide, per foot run	0	2	Flutings, &c. per foot run.
Rounded aris, do.	0	$1\frac{1}{2}$	
Elliptical or semicircular flutes, $1\frac{1}{2}$-in. wide, do.	0	$3\frac{1}{2}$	
Do. headings to the above, each at do.	0	$4\frac{1}{2}$	
Small mitred astragals, &c. to pilasters, do.	0	3	
Do. circular do. to columns, do.	0	4	

Dentils, in cornices, should be charged according to their sizes; also sinkings for fret-work, and the grooving to correspond therewith, by the foot running measure; the fret-work to be charged at double, treble, or quadruple, the price of the straight grooving, as an equivalent for the extra labour: the advanced price for which will entirely depend upon the intricacy of the fret-work and the number of mitres; housings may be charged at $1\frac{1}{2}$*d.* per inch. Dentils. Fret-work. Grooving. Housings, &c.

As, in the foregoing list, references are at all times made to the existing prime cost of the materials, the value also of fillets, beads, and all manner of narrow members, should be estimated in like manner; as also square blocks to pilasters, turned patteras, and fancy ornaments of every description, which are occasionally introduced in Ornamental Joinery; extensive lists of which, it is presumed, will be deemed unnecessary, as the greatest pains have been taken to elicit the only means of ascertaining the value of whatever works are not described, but which may occur in the course of practice, and the value of which, in many instances, will depend on local circumstances. Fillets or annulets. Square blocks and patteras, &c. Ornamental joinery.

	s.	d.	
Common 1-inch deal moulded surbases, two edges, 3 inches wide, per foot run	0	$4\frac{1}{2}$	Average prices of surbases and architraves, &c. per foot run.
1-in. deal single architrave, 4 in. wide, do.	0	$4\frac{1}{2}$	
Do. do. $4\frac{1}{2}$-in. wide, do.	0	$5\frac{1}{2}$	
Do. do. 5 in. wide, do.	0	$6\frac{1}{2}$	
Deal ovolo mouldings, 2-in. girt round panels of doors, mitred, do.	0	3	Paneling.
Do. do. $1\frac{1}{2}$-in. girt, do.	0	$2\frac{1}{2}$	
Do. do. 1-in. girt, do.	0	2	
Do. do. $\frac{3}{4}$-in. girt, do.	0	$1\frac{1}{2}$	
2-inch deal beaded staffs rebated, do.	0	4	Beaded staffs.
$\frac{3}{4}$-in. deal beads and slips, 2 inch wide, do.	0	2	
$\frac{3}{4}$-in. deal beads and fillets, 2 in. wide, do.	0	2	
$1\frac{1}{4}$-inch deal rough fillets, 2 inches wide, do.	0	$1\frac{1}{2}$	Deal fillets.
Do. 3 inches wide, do.	0	2	
$1\frac{1}{4}$-in. deal wrought fillets, 3 inches wide, do.	0	2	
Do. 3 inches wide, do.	0	$2\frac{1}{2}$	

On Water-Trunks, Aris, Fillet, and Bridged, Gutters.

Deal water-trunks, how to find the value.

Deal square hollow Water-trunks, for the conveyance of water from roofs down the fronts of buildings, are of various sizes and thickness, consequently the value of them, *per foot* running measure, must entirely depend on those circumstances; they should be pitched in the inside, and are usually finished in that way; of course, whatever tends to increase the expense, must be embodied in the estimate for their worth: to ascertain the quantity of materials in a foot run, the two sides, together with the intermediate pieces which form the trunks, should be embraced in one dimension: For example, suppose a water-trunk, 5 inches square, and the thickness to be one inch, to ascertain the quantity of materials; first, add the two sides together, at 5 inches each, which will be equal to 10 inches, the intermediate pieces, therefore, can only be 3 inches each; making altogether 16 inches in breadth. Now, to discover the value *per foot* run, examine the Table, No. 10, and it will appear that $3\frac{1}{2}d.$ per foot run is the value of inch-deal 9 inches wide; and, as 16 approximates very near to 18, double the value, the product will be seven-pence; to which may be added the further sum of seven-pence, for labour, nails, and pitch, making the total value fourteen-pence, which will be the fair value, *per foot* run, for water-trunks of the size described, according to Table, No. 10; that is, when 10-feet 3-inch deals are at £39. per hundred. This example, it is presumed, will be sufficient to shew the principle of arriving at the value of water-trunks of all sizes, as well as their appurtenances, including hopper-heads, &c.

Pitched in the inside, included in the value.

How to measure water-trunks.

How to analyze to find the value.

Reference to Table, No. 10.

Nails and pitch, per foot run.

Deals at £39. per hundred. Trunks of all sizes.

Aris-Gutters.

Aris-gutters, description of them; manner of fixing.

Aris-gutters are made in the form of the letter V, and are affixed to dripping-eaved roofs, for the purposes of receiving the water from the tiles, or slates, to be from thence conveyed to the sort of trunks before described; these gutters should also be pitched, on their inside surfaces, and hung upon inclined planes, to convey the water to the hopper-heads. The value of aris-gutters may be found in the same way as that of water-trunks; but, having only two sides, of the sizes of the latter, they will be of only half their value, or thereabouts.

Fillet-Gutters.

Fillet-gutters, description of them.

Fillet-gutters are used for the same purpose as the former, but are somewhat different in their shapes, inasmuch as both sides are not alike, the sides nearest the walls being nine inches, and the returns not more than three or four inches wide; they should be also pitched on their inside surfaces, and fixed in the manner before described, in order that the accumulated water, in the respective situations, may be speedily conveyed to its place of destination. The value of fillet-gutters may be ascertained in the same manner as the former; the difference in the expense of which, per foot run, will be about one-third.

Accumulation of water, speedy conveyance away; how to find the value.

Bridged-Gutters.

Bridged-gutters,

Bridged-gutters are those which are inclosed by parapet-walls, and are so contrived as to convey the water from the valleys of roofs to the extremities, or

outlets, to be secretly conveyed from thence, in water-trunks or vertical leaden-pipes, down the fronts of buildings. These gutters are formed by pieces of wood laid horizontally at the rafters' feet, which are elevated or depressed, as may be deemed necessary to produce the required declivities, and the pieces of wood, so described, called bridging-pieces, are boarded over with ¾-inch, 1-inch, or 1¼-inch, rough deal, and subsequently covered with lead. The worth is generally ascertained by the foot superficial; that is, for the carpenter's work, consisting of the bridging-pieces and rough boarding; and, as their widths are various, from the circumstances of elevation and depression, the dimensions, when taken, should be averaged, and liberal allowances made for the difficulties of guttering, in which there is unavoidable waste of time and materials.

the description of them; their utility, covered with lead, paid for by the foot super. Liberal allowances, waste, &c.

	s.	d.
5-inch square water-trunks, pitched, made of 1-inch deal, per foot run	1	2
6-in. do. do.	1	4
Do. with an impost neck, do.	1	5
5-in. water-trunks, pitched, and made of 1¼-in. deal, do.	1	4
6-in. do. do.	1	6
Do. with impost neck, do.	1	7
Inch-deal aris-gutters, pitched, 5-in. sides, do.	0	7
Do. do. with 6-in. sides, do.	0	8
1¼-in. do. do. with 5-in. sides, do.	0	8
Do. do. with 6-in. sides, do.	0	9
1-inch deal fillet-gutters, pitched, 13-in. girt, do.	0	9
1¼-in. do. do.	0	10½
1¼-inch deal bridged-gutters and bearers, do. at per foot super	1	3
1-in. do. do.	1	0
¾-in. do. do.	0	10

Water-trunks, per foot run. Aris-gutters, per foot run. Fillet-gutters, per foot run. Bridged-gutters, per foot run.

In the foregoing prices for water-trunks, aris and fillet gutters, it must be remembered that the prices do not include the value of fixing, which, in many instances, is attended with considerable expense; of course the additional time, and consequent value thereof, should be invariably charged and allowed, as well as all manner of contingent expenses.

Expenses of fixing.

On the Fittings-up of Stabling, &c.

Such Carpenters' and Joiners' works as are usually required in stables, should be valued in the same *ratio* as those of similar descriptions, with references to the value of the materials, whether oak, fir, ash, elm, beech, or larch. The workmanship to racks and mangers is somewhat different from the ordinary description, but the worth of it may be ascertained upon the same principles as those which have been repeated; in the exercise of which, it is presumed, the inexperienced or juvenile valuator will presently discover his interest.

Finishings of stables. References to similar works. Inexperienced valuators.

On Water-Closets.

In the finishings and fittings-up of water-closets, it seldom happens that the works about them do not, in general, correspond with those of similar descrip-

To be valued according to the preceding principles.

Customs of charging in the aggregate. tions, which have been before adverted to, and therefore repetitions of prices, in reference to them, are considered unnecessary. It is the custom, in many parts of the kingdom, for plumbers who furnish the apparatus, to finish, or cause to be finished, every part of these useful conveniencies, and to make their charge in proportion, which, in general, affords satisfaction.

On Rough Boarding.

Not planed. Labour and nails. Feet and inches.

Rough boarding implies such description of deal boards as have not been planed, but which are frequently used about public and private edifices for various purposes, where the only expense incurred in their appropriation arises from the value of the *labour* and *nails;* which, together with the boarding, is generally ascertained by the square, containing one hundred superficial feet; but whether by the square of *one hundred* feet, or by the foot square, containing one hundred and forty-four superficial inches, is quite immaterial, the result will be the same, as the value of one foot must be known before the value of one hundred feet can be determined on; in reference, therefore, to the primitive value, the Table, No. 10, must always be consulted as the standard.

How to find the value. Now, suppose the value of one square of $1\frac{1}{2}$-inch deal boarding is required, how is it to be ascertained? First, look to the Table, and discover the worth of $1\frac{1}{2}$-inch deal, per foot superficial; and, by reference, it will prove to be *7d.*, with the profit thereon: then one hundred times *7d.* will be the value of the materials, which is equal to the sum of *2l.* 18*s.* 4*d.*; to which must be added the value of the labour and nails, worth about one penny per foot, including profit, equal to 8*s.* 4*d.*, which, being added to the former, will make the entire value 3*l.* 6*s.* 8*d.* per square, for one hundred superficial feet, or 8*d.* per foot superficial.

		£.	s.	d.
Rough boarding, per square.	$1\frac{1}{2}$-inch deal rough boarding, per square	3	6	8
	Do. with edges shot, do.	3	8	11
	Do. ploughed and tongued, do.	3	13	2
$1\frac{1}{4}$-inch deal.	$1\frac{1}{4}$-inch deal rough boarding, do.	2	16	9
	Do. with edges shot, do.	3	0	3
	Do. ploughed and tongued, do.	3	5	9
1-inch deal.	1-inch deal rough boarding, do.	2	5	7
	Do. with edges shot, do.	2	6	7
	Do. ploughed and tongued, do.	2	10	1
$\frac{3}{4}$-inch deal.	$\frac{3}{4}$-in. deal rough boarding, do.	1	17	0
	Do. with edges shot, do.	1	19	0
	Do. ploughed and tongued, do.	1	19	6
	$\frac{1}{2}$-in. deal rough boarding, do.	1	5	7

On Sound-Boarding.

Effects of sound boarding. The term for this sort of boarding is derived from the circumstance of rough boards being introduced between the joists of floors, to deaden the sound between the upper and the lower stories; and, to produce the effect required, the boards should be closely fitted between the joists, about the middle of their

depth, and nailed to single or double fillets; and, when complete, covered with saw-dust nearly level with the tops of the joists, so that when the floors are laid, the spaces between the lower and upper rooms will consist of five thicknesses, namely, the plaster-ceiling, including the lathing, the sound-boarding, the saw-dust, and the floor-boarding, and by these means the sounds between floors may be so much deadened, that it will be difficult to hear any noise from above or below. Saw-dust.

To ascertain the worth of this sort of boarding, the dimensions of the rooms should be taken in the clear, and the thicknesses of all the joists deducted, but it would be far more satisfactory to measure the boarding before the floors are laid; for, after this operation is complete, the thicknesses of the joists must be guessed at, unless one or more boards are removed to examine the sizes of the joists. To calculate the worth of the boarding adverted to, the same system should be adopted as in the last example, taking into consideration the value of the fillets, with the extra costs of labour, nails, and saw-dust. How to value. Measure before. Fillets, &c.

	£.	s.	d.	
Rough 1-inch deal sound-boarding, with double fillets, per square....	2	8	7	Sound boarding, per square.
Do. $\frac{3}{4}$-in. do.	1	18	7	
Do. $\frac{1}{2}$-in. do.	1	7	4	

On Weather-Boarding.

Weather-boarding, when applied to the covering of dwellings or other buildings, can be considered only as a temporary sheathing to keep out the inclemencies of the weather. Temporary sheathings.

The value of weather-boarding may be ascertained by the foot superficial, or the square of one hundred feet, upon the same principles as other sorts of boarding, observing, at the time the dimensions are taken, to deduct all manner of openings, and to make the customary allowances for laps; which, being completed, the fillets round all the doors and windows should be taken, as well as those at the external angles, the prices of which being first computed by the foot superficial, will subsequently determine the worth per square; but where the quantities are in fragments, it is usual to value them by the foot superficial, as in the four following items: How to value. Deductions. Fillets. Feet and squares.

	£.	s.	d.	
Rough $\frac{3}{4}$-inch feather-edged deal, in hips and volleys, of different lengths	0	0	5	Weather-boarding, per foot super.
Do. with battens in do.	0	0	$6\frac{1}{2}$	
Do. on quartering to dormer-windows	0	0	$7\frac{1}{2}$	
Do. moulded, and rebated with bearers under	0	0	11	
Rough $\frac{3}{4}$-inch deal feather-edged weather-boarding on the outsides of buildings, per square	1	15	8	Weather-boardings, per square.
Do. planed do. do.	1	19	2	
Do. with champhered edges, do.	2	0	0	
Do. beaded do. do.	2	2	0	
Rough $\frac{3}{4}$-inch deal batten weather-boarding on the outsides of buildings, do.	1	17	8	Battens.
Do. planed do. do.	2	1	2	

		£.	s.	d.
Battens.	Rough ¾-inch deal batten weather-boarding on the outsides of buildings, with champhered edges	2	2	0
	Do. beaded do.	2	4	0
	1-inch deal rebated weather-boarding, planed	2	11	7

Observe.—The feather-edge boarding is calculated at the rate of $3\frac{1}{4}$*d.* per foot, including profit, which is only one farthing less than in the Table.

On Slate Boardings.

On the qualities of slate boardings, and to prevent the dry rot.

Slate Boardings are those descriptions of works, which are seldom or never measured until the carcases of buildings are completely covered in; consequently valuators, unless they have previously surveyed the works, cannot know any thing about the qualities of the boards; which, although not exposed to the weather, should be of the best yellow deal, free from sap: and these observations are made to prevent the ruinous effects which frequently occur in public as well as private buildings, where due care is not observed in the selection of dry sound materials, upon which the slates are to be laid: if the boards are not of the description mentioned, we may fairly anticipate that in a short time they will produce that species of *fungus*, which is known to produce what is called the *dry-rot*, germinated in the first instance by dampness, and, secondly, promoted by the want of ventilation.

How to value them.

The value of this sort of boarding is ascertained in the same way as common rough works of similar denominations; that is, by the foot superficial or the square of 100 feet, having references to the several thicknesses which govern the value, including labour and nails.

		£.	s.	d.
Slate boardings, per square.	¾-inch yellow deal rough boarding for slates, per square	1	17	3
	1-in. deal do. do.	2	5	7
	1¼-in. deal do. do.	2	16	0

On Common Deal or Oak Park Palings.

Palings measured by the rod.

The value of oak palings is ascertained by the English rod of $16\frac{1}{2}$ feet, running measure, including posts and rails, which, according to their numbers and thickness, serve to constitute the value, but which will chiefly depend upon the lengths of the pales, prepared in 5 and 6 feet. The worth of this sort of work differs more or less in value, according to situations, than any other which can be mentioned, arising from the variation of the value of oak timber, which may be different in every county or province throughout the kingdom. The average price, however, may be taken at £2. 10*s.* and £3. per rod; and deal palings in proportion to the average value of deals and fir timber, which may be easily computed.

On Battenings.

On the various sorts of battenings.

Deal Battenings or Studdings, as they are called in many parts of the kingdom, are of various descriptions. The battenings alluded to are chiefly strips of deal, of different thicknesses and widths, not more than 2 in., $2\frac{1}{2}$ in., or 3 in. wide, and 1 in., $1\frac{1}{4}$ in., or $1\frac{1}{2}$ in. thick. This sort of work is introduced in public and private buildings, for the purposes of producing artificial masks or

faces to the fronts of rough or damp walls, preparatory to their being lathed and plastered, or canvassed and papered. Battenings consist of vertical and horizontal pieces of wood of the relative sizes, previously described, fixed, nailed, or framed, against the walls, at the distances of two or three feet, care being taken that their surfaces are perfectly level, so that, when plastered, canvassed, or papered, their superficial contents shall be uniform throughout. And it is sometimes necessary to introduce quarterings or small scantlings of timber for the purposes mentioned, in which, and in all similar cases, minute calculations should be made, to ascertain the quantities of materials used in superficial squares, feet, or yards, as in the several instances may occur, to the end that exact prices for the different descriptions of battenings may be gained, which will be found to vary in proportion, according to circumstances, and to the quantities of materials which may have been consumed. From what has been described, it must be obvious that satisfactory prices for battenings cannot be conscientiously introduced. In order, however, to give as much information as possible, the following items are subjoined.

On the uniformity of battenings, and their difference in value.

Minute calculations.

	£.	s.	d.
$1\frac{1}{2}$-inch deal battenings, per square	0	16	0
$1\frac{1}{4}$-in. do. do.	0	14	0
1-in. do. do.	0	12	0
$\frac{3}{4}$-in. do. do.	0	10	0
Quarter battenings, 4 in. by $2\frac{1}{2}$ in., do.	1	3	0
Do. do., 3 in. by 2 in., do.	1	0	0

Average price of battenings, per square.

On Centerings.

Centerings for bridges and arches, of large dimensions, consist of gross pieces of the best Dantzic timber, which are framed, halved, dove-tailed, and bolted together, where required, and comprise several distinct ribs, each of which are divided into three, five, or more, component parts, in order that the center pieces may form what are called the keys to the ribs, which being completed, the entire of them are covered over with two-inch or three-inch planks, in order that the masons or bricklayers may proceed with their work, previous care being taken in the construction of the centerings, that the same may be lowered by degrees when the arches are turned: the value for such centerings is equal to about one-third more than for fir framed in roofs, with king and queen posts, besides the extra labour of fixing the ribs in their respective situations, and also of removing them when the arches are turned; and as the materials in these operations are valuable after the works are complete, they should be re-valued at about one-third of their original prime cost.

On the construction of centerings for bridges, and the value of them.

The centers to apertures, vaults, &c., are of various descriptions, and consequently will differ in their value. Those which are used for the purposes of enabling bricklayers to turn common arches over coal, wine, and beer, vaults, &c. are generally put together in the most simple manner; but, at the same time, it is to be observed, that the materials consumed in them are valuable, and that the time occupied in making them must be taken fairly into considera-

On the various kinds of centers.

The prices of centerings regulated by Tables, Nos. 7 and 10.

tion. It is, however, but candid to state, that the description of centers last mentioned, in general, do not merit the prices usually allowed; inasmuch as the materials converted to these purposes are, for the most part, of inferior qualities, and seldom fit for better uses; thirty-five shillings may, therefore, be considered a liberal price per square, and double the amount for complicated groined centers; that is, when the value of deals is regulated by the Table, No. 10; and fir timber is at four shillings per foot cube, as per Table, No. 7.

The method of the Irish artisans recommended.

The common masons and bricklayers in Ireland, who are remarkable for their adroitness and ingenuity, contrive to turn all their arches without incurring the expenses before-mentioned, which is performed by making artificial centers, consisting of dry walls, formed of bricks or stones, which fully answer the intended uses; and it has been matter of surprise, that the able artisans of our own country have not condescended to follow the example.

		£.	s.	d.
Centerings, at per square.	¾-inch deal centers to circular vaults, including all the requisite materials, at per square	1	15	0
	Do. groined centers, do.	3	10	0
1-inch deal.	1-inch deal centers to circular vaults, including all the requisite materials, at per square	2	2	0
	Do. groined centers, do.	4	4	0
¾-inch deal.	¾-inch deal centers to chimney trimmers, &c., at per foot superficial	0	0	6
	Do. to rough arches, per foot run	0	0	5
	Do. to gauged arches, do.	0	0	8
	Do. to cambered heads, do.	0	0	10
Circular arch.	Do. to semi-circular arches, and to elliptical heads.	0	1	4

An account to be kept of time and materials.

Where centers are complicated, as in parabolical works, or in groinings of peculiar descriptions, exact accounts of the workmen's time and materials should be kept; for it must be remembered, in all such cases, that large portions of materials are unavoidably wasted, as well as time, which can be fairly estimated only by day-work and the materials consumed, with suitable profits thereon.

On Labour and Nails for Roofing.

Roofing to be charged at per foot cube, including every expense;

Where the value of the timbers converted into roofs are charged at per foot cube, as *fir, without any labour*, the workmanship, including the nails, must be estimated separately; but we cannot discover any reason why the value of the latter should not be always incorporated with the value of the timber, at per foot cube, except as between the masters and their journeymen; but when the mode suggested is not the custom of the place where the work is done, the worth must be ascertained accordingly, by references to the presumed portions of time and the value of the nails; which, being proportioned in equitable scales, the goodness and difficulty of the workmanship may be fairly accounted for, at per square of 100 feet superficial measure, to be obtained by taking the lengths, and girting over the inclined surfaces for the widths.

if otherwise, at per square of 100 feet super.

	£.	s.	d.	
Common spanned roofs, three stories high	0	8	8	Roofs per square, for labour and nails.
Do. two stories	0	7	0	
Do. one story	0	6	0	
Common Leantoo roofs, three stories high	0	7	0	
Do. two stories	0	6	0	
Do. one story	0	5	0	
Common kirb roofs	0	10	0	
Spanned roofs, with principal rafters, tie and collar beams, including purlins	0	15	0	Spanned roofs.
Spanned roofs, with principal rafters, tie-beams, king-posts, struts, purlins, common rafters, &c.	1	2	0	Tie-beams, king-posts, &c.
Spanned roofs, with principal rafters, tie-beams, hammer-beams, queen-posts, struts, purlins, common rafters, &c.	1	5	0	Rafters, &c.

The above prices include hips, valley-pieces, ridges, &c. Fixing iron-work should be charged by the day; but where the time has not been regularly kept, valuators must exercise their discretion in making such allowances as, according to their judgement, will be equivalent to the men's wages, with reasonable profits thereon.

Labour and Nails to Naked Framed Floors, &c.

Naked floors, girders, mortises, tenons, &c.

Naked Framed Floors consist of timber scantlings, cut into divers cubical forms, frequently comprising trussed girders and trimmers, with bridging, common, and ceiling, joists, firmly united by means of mortises and tenons, &c., formed and cut out for the purposes required; which, being complete, the ceilings are attached thereto, and the boarded floors nailed to the upper surfaces; and by these and similar descriptions of floors, the altitudinal spaces, from the ground-floors up to the roofs, in buildings of every description, are divided into stories or floors for dwelling-houses, as well as for the varied uses of commerce, &c.

Treble framed floors.

Treble-fir Framed Naked Floors are of the last description, and are generally introduced into superior buildings, over the spaces of the best apartments, to prevent the ceilings and cornices cracking. And the value of such floors should be ascertained by the cubical contents of the several timbers, and charged as fir framed, including *labour* and *nails;* but where the value of the latter is not condensed in the prices per foot cube, the timbers should then be charged as fir *without any labour*, and the labour and nails at per square of one hundred superficial feet, which will be worth from 18*s.* to 25*s.* more or less, in proportion to the sizes of the rooms, or the scantlings of the timbers.

Double framed floors.

Double-fir Framed Naked Floors are not so expensive as the former, inasmuch as the quantities of materials consumed in them are somewhat less; but the value per foot cube in framing the timbers will be the same; and if charged as fir framed, with the *labour* and *nails* incorporated, the prices in both cases will be equal: but, if the latter sort of floors are charged separately at per square, the prices will then be less, as regards the value of the labour and nails; and because the worth thereof is so much less in proportion to the quantities of the

Single framed floors.

materials consumed. And the foregoing reasons will likewise apply to single framed floors in degrees of similitude with the former; so that the value of the labour and nails, with the intrinsic value of the materials, and the reasonable profits thereon, will be in all cases proportionately the same, if such works are considerately and equitably ascertained and valued.

Description of double framed floors.

Double Framed Naked Floors consist of trussed girders and transversed stout joists mortised into them, and of the same depths; to which are attached the laths and plastered ceilings, and on the upper surfaces thereof the boarded floors, which, altogether, constitute the thicknesses between the upper and lower rooms.

Single framed floors; how to secure them.

Single Framed Naked Floors consist only of strong joists and trimmers of suitable thicknesses, proportioned to their respective bearings, and are framed into the trimmers necessarily introduced round the hearths of fire-places, and the apertures left for stair-cases, &c.; and where the ends of the joists do not intersect with the trimmers, the former are notched down upon the tops of the wall-plates and partitions, and are caulked or nailed to the latter in the most secure manner; and, when complete, the ceilings and floors are attached to the lower and upper surfaces, as in the instances before described.

Ground-floors, staircases, &c.

Ground or Basement Naked Floors are similar to the above, except as regards the framing to trimmers and staircases, which is not required. The joists are notched upon the wall-plates and sleepers; and, when complete, are boarded in the usual way, with suitable boarding of 1-inch or $1\frac{1}{4}$-inch deals, or as may be required.

The worth of the timbers in the two last mentioned floors, in cubic feet, are not equal in value to the fir framed floors, as in the preceding, inasmuch as the value of the labour and nails is dissimilar, arising out of the works being less complicated; but where the works are well executed, and the timbers are suitably braced, nearly the same prices may be justly sanctioned, and especially where the scantlings of the timbers are small.

Ceiling-floors, transverse timbers, &c.

Fir Framed Naked Ceiling Floors are constructed to entirely cover the bodies of churches and chapels, as well as other lofty apartments, which have not any rooms over them; and they are also introduced to finish the soffits of garrets or the attic stories of dwelling-houses and other buildings. And when framed over the spaces first adverted to, they consist of strong transverse pieces of timber mortised into the tie-beams of roofs, the former of which are called binding-joists; and to the latter the ceiling-joists are framed, consisting of cubical pieces of timber of moderate dimensions; to which are attached the laths, and ultimately the finished plastered ceiling. The Naked Ceiling Floors, also, in the uppermost rooms of dwelling-houses, as well as every other description of buildings, are framed in the same manner, the scantlings of the joists consisting of numerous pieces of timber of small dimensions, the value of which should

Value to be ascertained by cubic feet.

be ascertained in cubic feet, and charged as fir framed; but, if the prices be required for labour and nails only, they may be obtained, per squares of 100 superficial feet, by ascertaining the averaged portions of time it will take workmen of moderate abilities to perform given quantities; to the value of which should be added the value of the nails, with twenty per cent. profit upon the two items. And to elucidate the equitable prices, per square, for labour and nails, upon roofs, floors, and partitions, of every description, the same pains should be

taken, and the ulterior products, when discovered, will present the information required. It is only by these and similar means that consistent prices, as the value of labour, can be ascertained. The full value, however, will ultimately depend upon the degree of goodness to which the works performed can be referred; and, under such circumstances, it is presumed to be indispensably necessary that valuators should be scientific men, not only fully qualified to estimate, but to discriminate between, the various degrees of works submitted to their valuation, in proportion to the skill manifested in the workmanship. Value of floors, &c. for labour and nails.

	£.	s.	d.	
Labour and nails to *treble* framed floors, consisting of trussed girders *framed*, ceiling-joists *framed*, and binding-joists *framed*, with bridging-joists transversed	1	6	0	Labour and nails to floors, per square.
Labour and nails to *double* framed floors, consisting of trussed girders *framed*, with joists in succession *framed* to the girders	1	2	0	Double framed floors.
Labour and nails to *single* framed floors, consisting of joists *framed* into chimney trimmers, as well as the apertures of staircases	0	10	0	Single framed.
Labour and nails to *single* framed floors on the ground, laid upon sleepers, and framed to chimney trimmers	0	8	0	Single on the ground.
Labour and nails to ceiling-floors in garrets, attics, and small rooms	0	9	0	Ceiling floors in attics;

The value of the labour and nails to ceiling-floors, in churches, chapels, and large rooms, must be ascertained in the manner hereinbefore described, the prices for which will be proportionate to the difficulty. of churches, halls, &c.

	£.	s.	d.	
Labour and nails to floors, with girders not trussed but sawn down the center, and the grain of the wood reversed and bolted together, including binding, ceiling, and bridging joists	1	4	0	Girders, sawn down, &c.
Do. do. with joists only, framed into girders	1	0	0	

Trussed girders should be estimated in cubic feet, as fir framed; and the oak trusses, including the king's, queen's, wedges, and iron bolts, charged as extras; the value of which will very much depend upon their sizes, and the ascertained weight of the iron. The worth of the groovings may be included in the prices of the framed works; or the entire value of the girders may be computed separately in cubic feet, which may be easily accomplished, by dissecting the various parts and adopting the same principles to arrive at their value, which has been previously illustrated by references to other works. How to value trussed girders.

On Boarded Floors to Rooms, &c.

Boarded floors are of different qualities and descriptions, and pains should be taken accordingly, in order to gain their exact value. In the construction of dwelling-houses, as well as of other buildings, these articles form prominent features; in the estimate it is, therefore, necessary that the qualities of the boards, as well as the manner of finishing the floors, should be perfectly understood, as upon these points will depend their ulterior value. On the qualities of boarded floors.

Common white deal boards are those generally converted to the purposes mentioned, and are highly appreciated by speculators in the building profession, White deal floors.

inasmuch as the prices usually charged for them are reasonable; and, for ordinary purposes, in common houses, it must be admitted, they afford, in general, satisfaction. Under such circumstances it would be fastidious to reject them; but where good and unexceptionable floors are required, it will be necessary to select materials of superior qualities.

Best sort of floors.

Dowelled floors.

Dry, well-seasoned, clean, yellow, deal battens, not more than 4 inches or $4\frac{1}{2}$ inches wide, are the best sort of boards which can be introduced for close floorings, and for the following reasons, the boards are less liable to shrink than when they are wider; and, as often as batten floors are introduced, consisting of deals of the above description, they should be prepared, and the floors laid in the best manner, by being dowelled, and the heading joints ploughed and tongued. When floors are executed in the way last described, the edges of the boards are nailed to the upper surfaces of the joists, and the boards united by means of oak or iron pins or dowels, introduced at short intervals into the edges of the boards.

Shrinking of boards.

Dowelled floors, their description; how performed.

Manner of laying dowelled floors.

In proceeding to lay dowelled floors, the work is commeneed against the walls or partitions, by nailing single boards next to them, but to the upper surfaces of the joists, so that when the skirtings are fixed, the nails so driven cannot be seen; and the boards next in succession are united, as before described, with oak or iron pins or dowels; projecting rows of which are fixed in the sides of the boards laid, and correspondent holes made to receive them in the next intended boards to be united, which being done, and drove home, the operations are successively repeated until the floors are finished, in the progress of which care should be taken to break the heading-joints; that is, by avoiding two heading-joints coming together, which is considered as a great imperfection in good floors, which, on being completed, should present smooth and even surfaces of clean deal, without any knots or nails being discoverable. The value of these floors should be ascertained by references to the prime costs of the deals and labour; but, if executed with common deals, the prices of them will be found under the respective heads and thicknesses of deals.

Dowels, iron or oak.

Heading-joints.

Ploughed and tongued floors.

Ploughed and tongued floors are, likewise, considered to be of the superior class of boarded floors, and therefore the materials used in the execution of them should be correspondent. These floors are also laid in the best sort of apartments, as well as in other places, which, according to circumstances, are suited to the intended purposes, and, in such cases, are executed accordingly; they should never be less than $1\frac{1}{4}$ inch thick, and the groovings to receive the tongues should be nearest the lower edges of the boards, to prevent the upper edges from curling, which they are apt to do when the boards are not of sufficient thicknesses, and where the latter precaution is not observed. The heading-joints should all be broken, and treated in the same manner as before described, and the value of the floors ascertained by the corresponding rules; that is, by references to the Tables, and the prime cost of labour, with the usual profits thereon. If executed with common deals, the ascertained value will be found under the several heads adverted to.

Deals $1\frac{1}{4}$-inch thick.

Joints should all be broken.

Value how ascertained.

Straight-joints and folding-floors.

These descriptions of boarded floors, are those which are most in use, and therefore deserving the highest consideration. Straight joint-floors, if well executed with dry well-seasoned boards, may be considered fit and suitable for

the best sort of rooms and passages in common houses, and folding boarded floors for the inferior apartments; the latter of which are described as folding, from the manner in which they are folded and laid down in their proper berths, at the times the works are executed: they may be easily recognized by their having three or more heading-joints altogether. The heading-joints to straight joint-floors are all broken, and the appearances of the floors altogether are superior to the former; and, in consequence of the difference in the modes of executing the works, the value of the labour will vary; but this, with the value of the materials, may be separately and correctly ascertained, as in the instances before described, by calculating the quantities and value of the boards consumed in squares of one hundred feet, superficial measure; the value of which, as per Table, No. 10, together with the value of the labour, nails, and profits thereon, will be the honest worth; the prices are shewn under their relative heads, in the succeeding pages.

Three-heading joints together.

Difference in value will vary, in quantities and labour, per square, Table, No. 10.

Warehouse-floors are boarded floors, which are particularly applicable to special purposes: they require to be stout, and should be laid in the following manner, so as to prevent the possibility of dust or dirt making its way through the crevices between the boards in the event of their shrinking; to remove such apprehensions, however, the boards should be, on all occasions, well seasoned; but, under any circumstances, if the edges of the rough boards are planed and laid in the usual manner, upon $\frac{3}{4}$-inch or $\frac{1}{2}$-inch deal fillets, $2\frac{1}{2}$ inches wide, it will be impossible that any dust or dirt can penetrate, as the broad fillets, let in flush with the upper surfaces of the joists, and extending the entire lengths of the boards, will cover the lower joints, and by these means produce the effect required, without incurring the expenses of ploughed and tongued floors, which, for reasons antecedently assigned, are inferior and more expensive than warehouse-floors: the differences in the cost may be ascertained by calculating the expenses of the grooves and tongues, compared with the rough deal fillets.

Warehouse-floors, how laid, to prevent dust injuring goods, &c.

Fillets to cover joints under. Flush with top surfaces of joists, less expense than ploughed and tongued.

Differences in value, how to be ascertained.

Quantities of Boards requisite for Squares, containing 100 *Feet Super.*

To ascertain the number of deal boards, *at any gauge*, which may be required to cover squares of naked floorings, &c., divide the number of running inches, contained in the superficial measure of a board, by 1200, the number of running inches in a square.

Common deals. Rule to ascertain the number.

Example.—How many 10-feet boards, 9 inches wide, will cover a square?

Example to prove the rule.

ft.	*in.*	
10	0	
	9	
7	6	0 = to 90 running inches.

90) 1200 (13 boards, and 2 feet 6 inches over. *Ans.*
90
———
300
270
———
30 = to one-third of a board.

Another example.

Or, Divide the number of superficial inches contained in the 10-feet board, 9 inches wide, by the number of superficial inches contained in a square.

Example.

The work

```
 ft. in.
 10   0
      9
 ---------
  7   6   0
144
-----
1008
  72
-----
1080=to the number of superficial inches in a board.
```

illustrated.

```
      inches.
       144
         100
       -----
1080)14400(13 boards and one-third of a board. Ans.
      1080
      -----
      3600
      3240
      -----
       360=to a third.
```

Confirmed proof.

Observe, 14,400 is the number of superficial inches contained in a square, and 1200 inches running measure, the latter of which, multiplied by the same number, will produce 14,400, which is a proof of the two Rules being correct, as may be seen by the above operation.

		s.	d.
$\frac{3}{4}$-inch deal flooring.	$\frac{3}{4}$-inch deal rough flooring, edges shot, at per square, 2*l.* 10*s.*; or, at per foot super	0	6
	Do. planed and laid folding, at per square, 2*l.* 15*s.* 10*d.*; or, at per foot super	0	7
Inch-deal floors.	Inch deal floors, rough edges shot, at per square, 2*l.* 15*s.* 10*d.*; or, at per foot super	0	7
	Do. planed and laid folding, at per square, 3*l.* 6*s.* 8*d.*; or, at per foot super	0	8
	Do. straight joint do. at per square, 3*l.* 9*s.* 2*d.*; or, at per foot super	0	8½
	Do. straight joint and tongued headings, at per square, 3*l.* 15*s.*; or, at per foot super	0	9

Inch-and-Quarter Deal Floors.

		s.	d.
$1\frac{1}{4}$-inch deal.	$1\frac{1}{4}$-inch deal floors, rough edges shot, at per square, 3*l.* 6*s.* 8*d.*; or, at per foot super	0	8
	Do. planed and laid folding, at per square, 3*l.* 9*s.* 2*d.*; or, at per foot super	0	8½

	s.	d.
1¼-inch deal floors, straight joint, splayed headings, at per square, *3l. 15s.*; or, at per foot super	0	9
Do. tongued headings, edges nailed, at per square, *3l. 19s. 2d.*; or, at per foot super	0	9½

Batten Floors.

Batten floors.

	s.	d.
Inch-deal batten floors laid folding, at per square, *3l. 2s. 6d.*; or, at per foot super	0	7½
Do. straight joint, with splayed headings, at per square, *3l. 9s. 2d.*; or, at per foot super	0	8½
Do. tongued headings and edges nailed, at per square, *3l. 19s. 2d.*; or, at per foot super	0	9½
1¼-inch deal straight-joint batten-floors, with splayed headings, at per square, *4l. 1s. 3d.*; or, at per foot super	0	9¾
Do. tongued headings and edges nailed, at per square, *4l. 3s. 4d.*; or, at per foot super	0	10
Do. dowelled, at per square, *4l. 11s. 8d.*; or, at per foot super	0	11
1½-inch yellow deal rough floors, edges shot, at per square, *3l. 15s.*; or, at per foot super (Common deal floors.)	0	9
Do. wrought and laid folding, at per square, *4l. 15s. 10d.*; or, at per foot super	0	11½
Do. straight joint, splayed headings, at per square, *5l. 6s. 3d.*; or, at per foot super	1	0¾
Do. tongued headings, edges nailed, at per square, *5l. 10s. 5d.*; or, at per foot super	1	1¼
Do. ploughed and tongued floors, at per square, *6l. 0s. 10d.*; or, at per foot super	1	2½
1½-inch deal rough warehouse-floors, edges shot, at per square, *4l. 1s. 3d.*; or, at per foot super	0	9¾

On Naked Framed Partitions.

Superior framing, how to be valued. Common partitions. Labour and nails, ascertainment of value, included in timber, with profit, &c.

Fir framed quarter-partitions are frequently required to be constructed upon scientific principles, consequently, their value for the labour and nails, per square, should be proportioned to the ratio of time those works will require to complete them; but, when partitions consist only of top and bottom plates, with diagonal stays, and perpendicular scantlings of small sizes, the prices for the labour and nails should be regulated accordingly, but always with reference to the ascertained value of the workmen's time, united to the value of the nails; which, being incorporated with the worth of the timber, should be charged, at per foot cube, as fir framed, including profit, labour, nails, and materials; and this system is recommended not only as being the most satisfactory, but the most correct way of coming at the honest value of fir-framed quarter-partitions; but, if the former method be adopted, that is, to charge the partitions per square, for labour and nails only, then the timbers should be charged at per foot cube, as *fir without any labour*, according to the several calculations hereunto referred, or by any other computation which may be more suitable, in reference to the original cost of the materials.

Labour and nails, per square, to framed partitions.		s.	d.
	Six-inch framed, trussed, king post partitions, with double struts, including top and bottom plates, and the perpendicular quarters, &c. at per square	14	0
	Do. with single struts, do.	12	0
	Do. with common braces, do	10	0
	Five-inch partitions framed, do.	9	0
	Four-inch do. do.	7	6

Land-Carriage and Freightage.

Charges for land-carriage, &c. *How to ascertain cost by measurement.* *Weights and measures.*

In the prosecution of public as well as of private works, the unavoidable expenses of land-carriage and freightage frequently amount to one-fourth, one-fifth, or one-sixth, of the prime cost of the materials. To ascertain the expenses thereof, after the works are measured, the cubic contents of the timber and deals, as well as other materials, should be incorporated, in order that the accumulated weights may be condensed, and charged at per ton, according to the rates of freightage, or land-carriage, to the places where the materials may have been conveyed; and, in order to form estimates of such expenses, it will be requisite to be in possession of the relative weights of timber, &c., in order to make the necessary calculations, which may be easily accomplished by allowing one-eighth, or one-tenth, of the cubical contents of timber and deals for waste; if this system be not adopted, the full amount paid for freightage and land-carriage should be allowed, with reasonable profits thereon, upon the attested vouchers being produced.

Memoranda relative to Weights of Timber, &c.

Fir timber. 65 cubic feet of fir timber is nearly equal to the weight of one ton.

Oak and Elm. 39 cubic feet of oak timber, ditto.

60 cubic feet of elm, ditto.

Ash, Beech, 45 cubic feet of ash, ditto.

51 cubic feet of beech, ditto.

Mahogany, 34 cubic feet of mahogany, ditto.

and Maple. 48 cubic feet of maple, ditto.

Weight of 120 ten-feet deals. 120 ten-feet three-inch deals, 9 inches wide, are equal to $4\frac{1}{2}$ loads of timber, or 225 cubic feet, the weight of which is equal to $3\frac{1}{2}$ tons.

Do. of 12-feet do. 120 twelve-feet two-and-a-half-inch deals, 9 inches wide, are also equal to $4\frac{1}{2}$ loads of timber, and are similar in weight to the former.

The following notes are subjoined, under the impression that they will be found useful to those who are employed to analyze artificers' works.

Superficial and cubic inches. 144 square superficial inches are equal to one square superficial foot; that is, a foot 12 inches long and 12 inches broad.

1728 square cubic inches are equal to one square foot cube; that is, a cube 12 inches long, 12 inches deep, and 12 inches broad.

12 inches lineal or running measure, are equal to one foot in length; each of the inches is either divided into quarters, and again sub-divided into eighths, or divided into tenths. Lineal measures.

1 inch is equal to the twelfth part of a foot, the standard for which measure has been regulated by the united lengths of three barley-corns. Fractional parts of feet.

3 feet lineal are equal to 1 yard in length, and 1 yard in length is equal to 3 feet. Yard run.

3 feet superficial are equal to 432 superficial inches; but 3 feet in length and 3 feet in breadth are equal to 9 superficial feet, and contain 1296 superficial inches, which are equal to 1 superficial square yard. Yard super.

3 feet cube are equal to 5184 cubic inches; but 3 feet in length, depth, and thickness, are equal to 46,656 cubic inches, which are the contents of a cubic yard, containing 27 cubic feet. Yard cube.

6 feet are equal to 1 fathom, a nautical measure, generally used by mariners. Fathom.

In taking the dimensions for lineal measures the lengths only are presumed to be taken; but it would be impossible to arrive at the intrinsic value, if the breadths and thicknesses also were not taken notice of. It is, therefore, absolutely necessary, in taking lineal dimensions, to refer to the breadths, as well as the thicknesses, if the articles measured possess substance sufficient to be identified by the measures described, which cannot fail to be the case as regards the breadths and the thicknesses also, unless the articles appertain to painting, white-washing, &c., where the thicknesses are comparatively ideal; but as regards lineal measures, which can be defined by references to substances, not only their lengths, but their breadths and thicknesses, must be specified, before the value can be properly ascertained by the foot running, or lineal measure. On taking dimensions by lineal measures. Painting and white-washing.

$16\frac{1}{2}$ feet running measure is an English rod. English rod.

21 feet running measure is an Irish rod; consequently, the miles in length, and the acres in superficial contents, will vary in the same ratio. Irish rod.

$16\frac{1}{2}$ feet multiplied by $16\frac{1}{2}$ feet will produce 272 feet 3 inches, which are the superficial contents of an English rod; 40 poles run is a furlong, and 8 furlongs a mile; 40 rods, or perches superficial, is a rood, 4 roods is an acre, and 640 acres is a square mile. Superficial English rod, &c.

21 feet multiplied by 21 feet will produce 441 feet, which are the superficial contents of an Irish rod, old standard. Irish do.

50 cubic feet of fir is considered a load of timber in England, and is estimated by that quantity. English load of timber.

40 cubic feet of fir is considered a load of fir timber in Ireland, and it is bought and sold at that standard, as at per ton, although 65 feet weighs a ton: the custom is a local one, and therefore mentioned. Irish do.

39 or 40 cubic feet of oak is considered a ton, or a load, in England, and the same in Ireland. Oak.

120 deals are considered by merchants and traders to be 100, and are sold after that rate. Of course, in estimating the value of Joiners' works, the deals must be calculated, with reference to the prime cost, at six score to the hundred. Long hundred.

Nails and screws. 120 nails, or screws, &c., are also considered as 100: they are purchased by the long hundred, and retailed at the short: as, for example, 1200 nails, or screws, &c. are purchased as at 1000, and are retailed at the latter number.

Superficial square. 100 superficial feet are considered equal to what is called a square of building, flooring, roofing, battening, tiling, slating, &c.; and therefore 100 is used as the proper divisor to find the contents.

English acre. 43,560 superficial square feet, or 4,840 superficial square yards, are equal to an English acre, or to 160 square poles.

Irish acre. 70,560 superficial square feet, or 7,840 superficial square yards, are equal to an Irish acre, or to 160 square poles, old standard.

English and geographic mile. 1760 yards lineal or running measure, or 5,280 feet, are equal to one English mile in length, comprising 320 poles or 8 furlongs; 2028 yards (in the centre of England) are equal to a geographic or nautic mile; 3 such miles make a league, and 60 make one degree, old standard.

Irish mile. 2,240 yards lineal or running measure, or 6,720 feet, are equal to an Irish mile in length, comprising 320 poles or 8 furlongs.

Cube inches in the standard gallon. 282 cubic inches are equal to one gallon of water or beer. To find the contents, therefore, of vessels known to contain given quantities, multiply the number of gallons by 282, and the product will be the number of cubic inches contained in such vessels. For example, suppose a butt to contain 108 gallons, how many cubic inches of water or beer will such vessel contain?

Square inches in a butt of 108 gallons.

282	inches in a gallon.
108	gallons in a butt.
2256	
282	
30456	cubic inches.—*Ans.*

Contents of a butt of water. A butt of water or beer is equal to nearly 18 cubic feet: hence, it appears that six gallons are nearly equal to a cubic foot; which information, it is presumed, will be found useful, in ascertaining the average sizes for cisterns sufficient for common purposes, as well as for making other calculations.

Abstract of an Act of Parliament passed in March, 1825.

Memoranda of a series of clauses extracted from the Act of Parliament, passed in the sixth year of the reign of His present Majesty George the *Fourth*, for ascertaining and establishing uniformity in Weights and Measures throughout the United Kingdom of Great Britain and Ireland: the operative powers of which are essential to be known by all persons who are in the habit of ascertaining quantities, and of measuring and valuing artificers' or any other description of works, either in England, Ireland, or Scotland.

On the uniformity of weights and measures. It being found necessary, for the security of commerce and the good of the community, that weights and measures should be just and uniform: and that there should be but *one* measure and *one* weight throughout Great Britain and Ireland:

Standard weights and measures not known.

Act to operate from 1st January, 1826.

Standard yard.

Ditto foot, inch, rod, furlong, and mile.

and that, in consequence of the true measure of the present standard not being exactly known, great confusion and gross fraud have prevailed; hence, to remedy and prevent such evils for the future, and to the end that fixed standards of weights and measures should be established, and universally known in all parts of Great Britain and Ireland, it has been enacted, that, from and after the first day of January, 1826, the straight line or distance between the centers of the two points in the gold studs in the straight brass rod now in the custody of the clerk of the House of Commons, shall be, and the same is declared by the act to be, the original and genuine standard of that measure, as regards length or lineal extension, called a *yard*, and that the same straight line or distance between the centers of the said two points or said gold studs in the said brass rod, shall be, and is declared to be, the unit or only standard measure of extension whereby all other measures of extension whatever, whether the same be lineal, superficial, or solid, shall be derived, computed, and ascertained; and that all measures of length shall be taken in parts or multiples, or certain proportions of the said standard yard; and that one-third part of said standard shall be what is called a *foot* in length, and the twelfth part of such foot shall be what is called an *inch*, equal in length to the united lengths of three barley-corns, and that the rod, pole, or perch, in length, shall contain five such yards and one-half; the furlong, 220 such yards; and the mile, which is eight furlongs, 1760 of such yards.

Yards in a rood, and an acre.

Rods in do.

It is also enacted, that, all superficial measures shall be computed and ascertained by the said standard yard, or by certain parts or multiples, or proportions thereof; and that the rood of land shall contain 1210 square yards, according to the said standard yard; and that the acre of land shall contain 4840 square yards, being 160 square perches, poles, or rods; and that one acre shall comprise 43,560 square superficial feet.

Brass weights in the House of Commons.

Imperial standard of the troy pound.

Pennyweights

Grains.

Avoirdupoise pound, ounce, and drachm.

The standard brass weight of one pound troy made in 1758, and now in the custody of the clerk of the House of Commons, shall be the original or standard measure of weight, and the same shall be denominated the *Imperial standard* troy pound, and be the unit or only standard measure of weight, from which all other weights shall be derived, computed, and ascertained; and one twelfth part of said troy pound shall be an ounce, and one twentieth part of such ounce shall be a pennyweight, and one twenty-fourth part of such pennyweight shall be a grain, so that 5760 of such grains shall be a pound troy; and 7000 such grains shall be a pound avoirdupoise; and one sixteenth part of the said pound avoirdupoise shall be an ounce avoirdupoise; and one sixteenth part of such ounce shall be a drachm, or fractional part, of said pound.

Strike or even measure.

Gallon the unit of measure.

And the act also recites, that, from and after the *first* day of January, 1826, the standard measure of capacity, as well for liquids as dry goods, not measured by heap measure, shall be the gallon, containing ten pounds, avoirdupoise weight, of distilled water weighed in air, at the temperature of sixty-two degrees of *Fahrenheit's* thermometer, the barometer being at thirty inches, and that such measure shall be forthwith made of brass, of such contents as aforesaid, under the directions of the Lord High Treasurer of the United Kingdom, or any three or more of the Lords of the Treasury, for the time being; and that such brass measure shall be, and is by the act declared to be, the *Imperial standard* gallon, and shall be declared

Liquid and dry goods. — Imperial standard gallon, quarts, pints, pecks, bushels, &c.

to be the unit and only standard measure of capacity, from which all other measures of capacity are to be used, as well for wine, beer, ale, spirits, and all sorts of liquids; as also for dry-goods not measured by heap measure: and it is also enacted, that all such measures shall be taken in parts or multiples, or certain proportions, of the said *Imperial standard* gallon; and that the quart shall be *one-fourth* of said gallon, the pint *one-eighth*, and that two of the said gallons shall be a peck, and eight such gallons a bushel, and eight such bushels a quarter of corn, or other dry goods, not measured by heaped measure.

Coals, culm, lime, &c. — Bushel equal to eighty lbs.

The act recites, that, the said standard measure of capacity for coals, culm, lime, fish, potatoes, or fruit, and all other goods and things usually sold by heaped measure, shall be the before-mentioned bushel, containing eighty pounds, avoirdupoise, of water as aforesaid; and that the said measure shall be made perfectly round, with a plain and even bottom, being nineteen inches and a half from outside to outside of such standard measure.

Heaped measure to rise six inches. — Bushels, sacks, and chaldrons.

It is enacted that, in making use of such bushel to measure coals, culm, lime, and other goods or things commonly sold by heaped measure, the same shall be duly heaped up in such bushel measure, in the form of a cone, and such cone shall be of the height of at least six inches, and that the outside of said bushel shall be the extremity of the base of such cone, and that three such bushels shall be a sack, and that twelve such sacks shall be a chaldron.

Magistrates in England, Ireland, Scotland, &c. — Counties, ridings, and divisions, &c — Models and copies. — Chamberlain of Exchequer. — Models and copies verified. — Keepers of said models. — Notice to produce them, in writing. — Fees to be paid. — Duties of magistrates.

And the act also recites, that his Majesty's justices of the peace in every county, riding, or division, in England, Ireland, and Scotland, and also in every city, town, or place, (being a county within itself,) in England or Ireland, and in every city or royal burgh, in Scotland, shall, within six calendar months after the passing of this act, purchase for their respective counties, ridings or divisions, shires or stewartries, cities, towns, or places, or cities or royal burghs, a model, and copy of each of the aforesaid standards of *length*, *weight*, and *measure*, and of each of the parts or multiples thereof; which models and copies when so purchased, shall be compared and verified with the models and copies deposited with the Chamberlain of the Exchequer, at *Westminster*, and upon payment of the fees at present payable to the said chamberlain, and upon comparison and verification of such weights and measures with the standards thereof: such models and copies, when so compared and verified, shall be placed for custody and inspection with such person or persons, and in such place or places, as the said justices and magistrates, in their respective counties, ridings, divisions, shires, stewartries, cities, towns, or places, or cities or royal burghs, shall appoint, and the same shall be produced by the keeper or keepers thereof, upon reasonable notice, at such time or times, place or places, within each such county, riding or division, shire or stewartry, city, town, or place, or city or royal burgh, as any person or persons shall, by writing under his or their hand or hands require: the person requiring such production paying the reasonable charges for the same; and to the end, that weights and measures may be uniform throughout *England*, *Ireland*, and *Scotland*, the magistrates and justices of the peace are required by the act to see that the same is carried into effect, in order that the principles of equity, as regards weights and measures, may be uniformly established in all parts of *His Majesty's dominions* to which the act refers; and the act also recites, that models and copies of such standard

weights and measures shall be furnished by said Chamberlain to the Lord Mayor of London, Chief Magistrates of Edinburgh and Dublin, and of such other cities and places, and to such other places and persons in his Majesty's dominions, or elsewhere, as the Lord High Treasurer or Commissioners of the Treasury may, from time to time, direct. London, Edinburgh, Dublin, &c.

SPECIFIC GRAVITY OF BUILDING MATERIALS, IN REFERENCE TO THE SPECIFIC GRAVITY OF ONE CUBIC FOOT OF WATER.

	Avoird. lbs.	oz.	
One cubic foot of water, occupying a space equal to 1728 cubic inches, is equal in weight to 1000 ounces avoirdupoise; or, to	62	8	Water.
One cubic foot of lead is equal to	707	13	
One do. of copper to	562	8	Metals, &c.
One do. of wrought-iron to	477	13	
One do. of cast-iron to	464	1	
One do. of white-lead to	197	8	
One do. of Memel and Dantzic fir-timber to	34	6	
One do. of elm to	37	13	Timber.
One do. of beech to	43	12	
One do. of maple to	47	3	
One do. of ash to	50	0	
One do. of oak to	57	13	
One do. of mahogany to	66	7	
One do. of Portland stone to	156	4	
One do. of flint to	160	10	Stone and glass.
One do. of marble to	169	1	
One do. of granite to	218	12	
One do. of green-glass to	162	8	
One do. of sand to	95	0	
One do. of chalk to	112	1	Sand, clay, chalk, bricks, &c.
One do. of common earth to	124	0	
One do. of brick do. to	125	0	
One do. of clay to	135	0	

This table will be found of great use in making calculations for the prices of freightage and land-carriage, as well as for ascertaining the specific weights of buildings.

CHAPTER II.

On Sawyers' Works.

The value of sawing incorporated in Joinery, &c.

THE sums which are paid by Master-Builders to Sawyers far exceed what can be estimated by those who are not intimately acquainted with the Building Profession; the subject, therefore, is worthy of consideration, as regards the value of Carpenters' and Joiners' Works; inasmuch as the charges of the former are incorporated in the latter.

Prices different in various parts.

In the various counties of the United Kingdom, the charges for Sawyers' works are widely different. In some places it is the custom to charge *two cuts* for *one* upon pieces of timber, as an equivalent for the time in putting them on the pits and removing them; also *three* cuts for *two*, and *four* for *three*, and for the same reasons; but when four cuts are made in pieces of timber, the charges are not any more: yet, if timbers are cut into planks, extra cuts are charged for works not executed; and these are customs presumed to be, *prima faciæ*, somewhat inconsistent. Sawyers' works, as well as others, should be accurately measured, and fair prices allowed thereon, but consistent with the average wages of the country; and it is to be regretted that such inconsistencies as have been mentioned do prevail in many parts of the kingdom, as they are calculated, in many cases, to impede the progress of improvement in building.

On the measuring of Sawyers' works.

Fir timber. Deals, at per dozen. Flat cuts. Cross cuts. Hard woods.

The labour upon sawing fir timbers should be charged by the square of one hundred superficial feet; deals according to their respective lengths, in the same proportions, at per piece, or at per dozen cuts; flat cuts, at per foot running measure; cross cuts, at per inch; and oak, elm, mahogany, wainscot, ash, beech, and every other description of timber, should be measured in the same manner as fir, and valued in proportion to the hardness, and to the consequent difficulties of the Sawyers in their operations.

Average Prices for Sawing.

		s.	d.
Fir.	Fir timber, at per hundred feet, superficial measure	4	0
Deals, in planks, from 10 to 20 feet.	10-feet deals, at per dozen cuts	3	0
	12-feet do.	3	6
	14-feet do.	4	0
	16-feet do.	4	6
	18-feet do.	5	0
	20-feet do.	5	6
Under 10 feet.	9-feet do.	2	6
	6-feet do.	2	0

	s.	d.	
20-feet battens, per dozen	4	6	Battens.
18-feet do.	4	0	
16-feet do.	3	6	
14-feet do.	3	0	
12-feet do.	2	6	
10-feet do.	2	0	
14-feet Sweden deals, do.	4	6	Sweden deals and planks.
12-feet do. do.	4	0	
10-feet do. do.	3	6	
20-feet planks, do.	7	6	
18-feet do. do.	6	9	
16-feet do. do.	6	0	
14-feet do. do.	5	3	
12-feet do. do.	5	0	
10-feet do. do.	4	0	
8-feet do. do.	3	3	
6-feet do. do.	2	6	
Pantile laths, per dozen	0	8	Laths, &c.
Oak wedges, per pair	0	5	
Fir ditto, ditto	0	3	
18 and 20 feet deals, per dozen	2	0	Flat cuts.
14 and 16 feet do. do.	1	9	
10 and 12 feet do. do.	1	6	

Difference in value of sawing mahogany, oak, elm, and beech.

The value of sawing upon mahogany is worth about three times as much as fir; and upon oak, elm, ash, and beech, twice as much. The value of sawing upon hard wood, in a great measure, depends upon the thicknesses required; if under one quarter of an inch, one-third or one-fourth may be added to the latter, and rationally in the same degrees under one inch.

How to find the value of sawing.

To find the value of sawing upon deals, planks, battens, or any other description of boards, first ascertain how many *superficial* feet are contained in one dozen: then say, if 100 superficial feet are worth 4*s.* how much will the quantities contained in the boards referred to be worth? and the contents being found, the product will serve to regulate the prices, at per dozen. The sawing upon fir timber and deals is work of the same description; and, consequently, their relative prices will be nearly the same, or ought to be so; and if they are not, then the principles adopted to find their value must be not only inconsistent, but at variance with the rules of equity.

Tables of fir timber and deals.

In the series of Tables on timber and deals which have been constructed to perpetuate the system of valuing Carpenters' and Joiners' works, the prices allowed for sawing upon loads of timber, are 3*d.* per foot, or 12*s.* 6*d.* for fifty cubic feet, and which prices are presumed to be liberal, as having reference to scantlings of every description; of course, when the scantlings of timbers are large, the profits will be greater than when they are small. The average prices, however, will be found in favour of the building profession, the members of which are constantly subject to losses, for which they cannot be suitably compensated but by the contingent profits, which are casually more or less.

Accounting for the land-carriage and sawing.

In the Timber and Deal Tables, before referred to, it will be observed, also, that 3*d.* per deal has been added to the prime cost value of the several thicknesses of deals in the second columns, which must be considered as equivalents, not only for the value of the sawing, but likewise for moderate degrees of cartage. If 3*d.* per deal was allowed only for sawing it would be too much, as, under those circumstances, the sawing upon $2\frac{1}{2}$-inch, 2-in., and $1\frac{1}{2}$-in. deals would be after the rate of 3*d.* profit for each cut, as in the last mentioned thicknesses of deals there cannot be any more than one cut in every 3-inch deal. But upon $1\frac{1}{4}$-inch and 1-in. deals the extra charges are only after the rate of $1\frac{1}{2}$*d.* per cut; upon $\frac{3}{4}$-inch deals, 1*d.*; and upon $\frac{1}{2}$-in. deals, the sum of $\frac{1}{2}$*d.* and a fraction. But upon investigation, however, it will appear that 3*d.* only has been incorporated into the average prices of each of the 10-feet 3-inch deals, as allowances for land-carriage to the distances of one mile or one mile and a half, which is after the rate of 6*s.* 8*d.* per load, or £1. 10*s.* for every hundred of ten-feet three-inch deals 9-inch wide, reckoning six score to the hundred, which are equal to the weight of $3\frac{1}{2}$ tons, and they are charged at the rate of 8*s.* 7*d.* per ton in the tables, for cartage.

Average 3*d.* per deal.

Carriage for one mile.

On the weight of deals.

Three-pence per cut for deals.

In the preceding prices ten-feet three-inch deals are charged at 3*s.* per dozen for sawing, which is after the rate of 3*d.* for every cut. Now, in order to make it clear that no more is charged for sawing than is consistent, we shall explain the ratios of sawing and land-carriage on each deal, in reference to the thicknesses, by the engraving made for that purpose.

Elucidation of fig. 1 on sawing.

In the first place, we find there is by the annexed engraving, *Fig.* 1, six $\frac{1}{2}$-inch deals in one 3-inch, but only in five cuts, which at 3*d.* each makes 1*s.* 3*d.*; but as the six $\frac{1}{2}$-inch deals are charged at 3*d.* each, the odd 3*d.* is for the land-carriage, making out the 1*s.* 6*d.*

Explanation of fig. 2.

By the same engraving, *fig.* 2, it also appears there are four $\frac{3}{4}$-inch deals in each 10-feet 3-inch deal, but only three cuts: 9*d.* is charged for the three cuts, and the odd 3*d.* for land-carriage, which makes out 1*s.*

Illustration of fig. 3.

Fig. 3 also shows that three 1-inch deals may be obtained out of one 10-feet 3-inch deal, but only two cuts, which at 3*d.* each is 6*d.*, leaving the odd 3*d.* for the land-carriage to make out the 9*d.*

Elucidation of fig. 4.

Fig. 4 represents a 3-inch deal, as before, out of which two $1\frac{1}{4}$-inch deals can be obtained and one $\frac{1}{2}$-inch deal, but only two cuts, which at 3*d.* each makes 6*d.*, leaving the odd 3*d.* to make up the 9*d.*

The same of fig. 5.

Fig. 5 shows, also, a 3-inch deal, as before, and the means of obtaining two $1\frac{1}{2}$-inch deals, but only one cut, which at 3*d.* and 3*d.* for land-carriage, makes out the 6*d.*

Fig. 6 explained.

Fig. 6 also represents the thickness of a 3-inch deal, showing the manner of obtaining a 2-inch and a 1-inch deal with only one cut, at 3*d.*, which together with 3*d.* for the land-carriage, makes out the 6*d.*

Fig. 7 likewise.

Fig. 7 shows also the thickness of a 3-inch deal, describing how to obtain one $2\frac{1}{2}$-in. deal and one $\frac{1}{2}$-in. deal, with one cut, at 3*d.*, leaving 3*d.* for land-carriage.

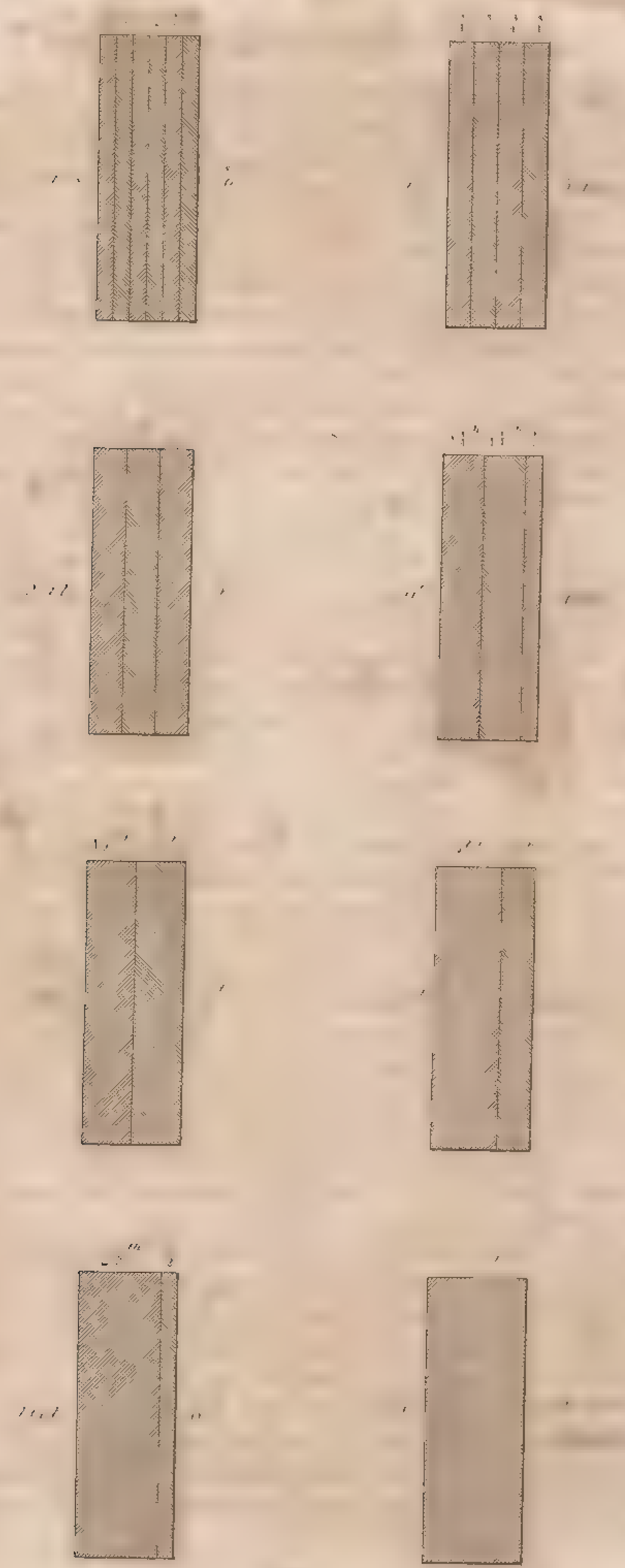
Fig. 8 explained.

Fig. 8 shows also the thickness of a 3-inch deal, without any cut, but for which the sum of 3*d.* is added as in all the Tables for land-carriage.

Land-carriage incorporated.

And thus it will appear, that the prices for land-carriage and sawing upon the deals have been incorporated and well considered, both as regards the interest of the builder and his employer.

SECTIONS OF 3D DEALS ELUCIDATING THE SAWING, &c.



CHAPTER III.

On Bricklayers' and Common Masons' Works, in Reference to the General Practice and Customs of England, Ireland, Scotland, &c.

Bricklayers' Prices, &c.

THE following are prefatory observations to the average prices of Bricklayers' Works, &c., with remarks on the various customs of measuring the same in different parts of the kingdom. General remarks on brick-work.

Bricklayers and *Masons*, in many parts of the United Kingdom, are identified as men following the same business; and this arises frequently from the former and the latter being under the necessity of embracing the two trades, inasmuch as it would be impossible, in many parts, either for masons or bricklayers to carry into execution their several works, if bricklayers were not masons, and the latter the former. In countries abounding with common building stones and flints, the latter materials are incorporated with bricks and mortar in various masses, comprehending walls of every description, the external and internal quoins of which, together with the chimnies, doors, windows, and apertures of every denomination, are built with coarse bricks, and the remainder of the walls with quarried stones and flints collected for the purpose. And in districts where economy is practised in the application of materials towards the formation and construction of walls, masons and bricklayers are unavoidably compelled to follow the two trades, and, consequently, are recognised as the same description of persons; but although expert in building rough walls, it is not to be expected that such persons can be equal in science to bricklayers who are constantly employed in the completion of works, where the walls are composed chiefly of bricks and brick-work of various denominations, interwoven with Stone-cutters' works, consisting of plinths, belting-courses, cornices, and frontispieces of the most magnificent description. In the construction, however, of rough walling, country bricklayers and masons are as expert in the performance of their works as the most scientific bricklayers. Nor are the former to be less appreciated, inasmuch as they are better qualified for executing country works than men who are usually employed in superior under-

Bricklaying and masonry united in some parts of the kingdom.

Brick quoins and stone walls

Rough walls.

Superior bricklayers.

Value of rough walling.

takings, at higher wages; and, consequently, the value of rough walls, in reference to local wages, but especially to materials easily procured, may be executed, in many parts of the kingdom, with good sound materials, consisting of bricks, stones, and flints, including mortar, at £7. 12*s.* per English standard rod, containing 306 cubic feet, which is after the rate of 6*d.* per foot cube, being also about half the price usually charged for a rod of brick-work in London. Upon this view of the subject, it is evident that where buildings are necessarily carried into execution with bricks, the expenses of walling must be increased in the proportion of *two* to *one*.

306 cubic feet a rod.

Modes of measurement in Ireland, Scotland, and the North and West of England.

In the provinces alluded to, as also in Wales, and other places where the major part of the walls to buildings are constructed with rough quarried stones and hard bricks, it is of consequence to every one connected with improvements to be satisfied with the charges for such works, as well as with the customs of measuring, without the knowledge of which it would be impossible to form any estimate of the justness or propriety of builders' charges.

On the system practised by bricklayers in Ireland.

It is the custom in some of the provinces and counties alluded to, for bricklayers and masons to include in their measurements all manner of openings, such as doors, windows, chimnies, flues, &c. in the solidity of the walls, as if they were built up; then to measure the reveals, arches, and workmanship to the flues, &c. in addition thereto; the quantities of rods or perches of walling represented by the openings frequently equal one-third or one-fourth of the entire buildings. In justification of the custom, it has been attempted to be proved that the prices have been consistently regulated, but upon what principles we have not yet been able to discover.

The fairest method of measuring bricklayers' and masons' works.

The fairest and most proper methods of measuring Bricklayers' and Masons' works of the before-mentioned description is, first, to measure all the solid works which have been executed, taking care to deduct the openings, and then to measure, per foot lineal, all the brick quoins, reveals, arches, &c., taking care, also, in affixing the value, to make suitable allowances for the solid contents of the brick-work incorporated in the admeasurements of the masonry, or to deduct the value thereof, and to allow for the worth of the brick-work separately. In Ireland, where buildings of great extent are frequently carried into execution, the bad customs pointed out are very prevalent.

How to find the quantities in Irish perches, &c.

An Irish rod or perch of stone-walling, including brick quoins, is *twenty-one feet in length, eighteen inches in breadth,* and *twelve inches in depth*; and to find the number of perches contained in a piece of rough stone-work, the following is the method. First, divide the superficial area by 21, and the quotient, if any, will be the answer in rods or perches, and the remainder, if any, will be feet. If the wall is more or less than 18 inches thick, multiply the area of the wall by the number of inches in thickness; which product, divided by 18, and that quotient by 21, will give the perches or rods contained.

EXAMPLE.

Stone walls.

A piece of stone-work, including brick quoins, 40 feet long, 20 feet high, and 24 inches thick; how many perches or rods are contained therein?

```
      feet.
       40 length.
       20 height.
      ----
      800
       24
     -----
     3200
    1600
    -----
18) 19200 (1066
    18
    ---
     120                        per.  ft.
     108              21) 1066 (50   16
     ---                  105
      120                 ---
      108                  16
      ---
       12 equal to 8 inches.
```

Ans. 50 *per.* 16 *ft.* 8 *in.*

Example of finding the number of Irish perches.

The method last described to find the superficial area is usually adopted; but the easiest and most expeditious way of ascertaining the value is to cube the contents of the wall, and to charge the work at per foot cube, by which means a great deal of unnecessary trouble is saved in reducing the several thicknesses into rods or perches, as in the preceding example.

Another method of finding the same.

The cubical contents of a rod or perch of stone-work is 31 *ft.* 6 *in*: if the dimensions, therefore, are taken and squared accordingly, and the product doubled, as also the divisor, the contents will be accurately ascertained, as per following example, in perches as well as in cubic feet.

How to find the value in cubic feet.

```
     feet.
      40 length.
      20 height.
     ----
     800
       2 thickness.
    -----
    1600
    1600
    -----
63) 3200 (50
    315
    ---
    ..50 = to 25 cubic feet.
```

Ans. 50 *per.* 25 *ft.*

To ascertain the value of common stone-work, with brick quoins, calculations should be made of the prime cost of all the component parts, consisting of the bricks, as well as the stones in the quarries, the expenses of quarrying, land-carriage to the places where it is to be used, with the extra trouble and conse-

To ascertain the value of common stone work.

quent expenses in carrying the bricks and stones one, two, three, or more, stories high; also the price of the lime when delivered, together with the expenses of the sand, the expenses of scaffolding, and extra expenses of wages to workmen, if distant from home; all these matters must be taken into consideration, in finding the value of an Irish perch or rod of common stone-work in any part of the country; the value of which will be found to vary, according to local circumstances, in degrees scarcely credible.

Price of the lime, sand, &c. Wages, if distant from home. All contingencies should be allowed

Computations of stone-work in Ireland.

Calculation, shewing the Manner of finding the Value of Rods or Perches of STONE-WORK, *in the Northern and Southern Parts of* IRELAND.

Marginal note	Item	s.	d.
Quantities of stone necessary for a perch.	Four cart-loads of the common building-stone will perform a perch of stone-work, which, together with quarrying, loading, and land-carriage, one mile, will cost on the average	4	6
Average value of an Irish barrel of lime.	A barrel of lime, containing forty-two gallons, will perform a perch of stone-work, and will cost, including carriage, on the average	1	10
Irish barrel of sand.	Two barrels of sand to each barrel of lime will be sufficient for a perch of stone-work, and will cost on the average	1	4
Mason or bricklayer. The several floors.	A mason's or bricklayer's time in performing a perch of stone-work, reckoning, on the average, foundations, basements, parlour-floors, with one and two pair floors, gables, scaffoldings, and such other unavoidable expenses, will cost	2	4
Labourer's time in attending masons and bricklayers.	A labourer's time in making the mortar, and attending the masons or bricklayers with it, together with supplies of stones, and occasionally bricks from the foundations to the tops of buildings, will cost, on the average, per rod	1	6
	Profit about 10 per cent	1	0
		12	6

All manner of openings deducted.

It must be remembered that, in the before-mentioned calculations, all manner of openings are presumed to be deducted, *viz.* doors, windows, chimnies, and their flues; but, if the latter are included, then the usual charges for pargetting them should be omitted.

Brick-work in Ireland. Irish perch of brick-work, differs from stone in thickness. Stone walling cheaper than brick. Brick-work about the same value as in London.

Brick-work, in the parts before alluded to, should be also measured in the same manner as stone-work, and reduced to the standard rod or perch of the country, as before described, except as regards thickness; a rod or perch of brick-work in Ireland is twenty-one feet in length, one foot high, and *nine* inches thick only; the cubical content of which is 15 feet 9 inches, being half the solid content of a perch of stone-work. Now, by calculations, it appears that one cubic foot of brick-work is worth *eleven-pence*, and by similar calculations it likewise appears, that one cubic foot of stone-work is worth only *five-pence;* a tolerable good proof that stone-walling is cheaper than brick-work, and in the ratio of *two to one;* and, moreover, that brick-work is nearly of the same value, per foot cube, in the remote parts of the kingdom, as it is in London; and to elucidate which examples have been adduced. Hence the average value of brick-

work may, with fairness, be presumed to be nearly the same in most parts of the United Kingdom; at least, approximating in ratios of affinity sufficient for making general estimates.

Brick-work in the provinces of Connaught, Leinster, Munster, and Ulster.

To find the contents of brick-walls, according to the practice in the four provinces of Ireland, first, multiply the length by the height in feet and inches, and the product, by the number of inches in thickness: the last product, divided by 9, and the following quotient by 21, will discover the true contents in rods or perches; but, when the thickness is only 9 inches, the length and breadth multiplied together, and divided by 21, will produce the number of perches.

EXAMPLE.

Example to elucidate.

In a piece of brick-work, 40 feet long, 20 feet high, and 24 inches thick, how many perches of brick-work are contained?

The annexed work elucidates.

ft. *in.*
40 0 length.
20 0 height.

800 0
24 inches in thickness.

3200
1600

The work.

9) 19200 (2133
18

12
9

30
27

30
27

3

per. *ft.*
21) 2133 (101 12 *Ans.*
21

33
21

12

Another example.

Second Example: Supposing the brick-wall to be the same dimensions, but only 9 inches thick?

ft. *in.*
40 0
20 0

The work.

21) 800 0 (38 rods 2 feet. *Ans.*
63

170
168

2

Value of brick-work in the Northern and Southern counties of Ireland.

Calculation shewing the Manner of finding the Value of Rods or Perches of Brick-Work *in the Northern and Southern Counties of* Ireland.

Margin note	Item	s.	d.
Value of the bricks.	Two hundred and forty bricks are sufficient to complete a rod or perch of brick-work, which, together with freightage and land-carriage, will cost on the average	7	4
The value of lime.	A barrel of lime, containing 42 gallons, will be sufficient to complete a rod or perch of brick-work, and will cost, including land-carriage, on the average	1	10
Ratios of sand to barrels of lime.	Two barrels of sand to each barrel of lime will be sufficient to complete a rod or perch of brick-work, and will cost, including carriage, on the average	1	4
Bricklayer's and mason's time.	A bricklayer's or mason's time in performing a rod or perch of brick-work, reckoning, on the average, foundations, basements, parlour-floors, with one and two pair floors, gables, scaffolding, &c. &c.	2	0
Labourer's time in making mortar, &c.	Labourer's time in making the mortar, and in attending the bricklayer with the same, including also the labour of serving the bricks	1	0
	Profit	1	0
		14	6

Price of bricks in Ireland. Land-carriage, freightage, &c.

In the preceding calculations, the bricks are presumed to be 30*s.* per thousand, which includes the average costs of freightage and land-carriage, and it must be likewise recollected that the price, per rod or perch, has been ascertained, with reference to all the openings being deducted.

Margin note	Item	s.	d.
Perches of stone-walls.	The value of a perch of stone walling, in the Northern and Southern provinces, in building a common fence wall, is	9	9
Dry walls.	Do. do. in a dry wall	6	6
Brick-work.	Do. of a rod or perch of brick-work, both sides worked fair	13	0

Brick-work in Dublin.

The subsequent are the average Prices of Bricks, Lime, and Sand, in Dublin, *together with the average Prices of Bricklayers' Works and Masonry.*

Margin note	Item	£.	s.	d.
Bricks.	Red stocks, at per 1000	3	8	3
	Grey stocks, do.	2	10	0
	Marl stocks, do.	2	10	0
	Place or common do., do.	1	16	0
Lime.	Lime, at per hogshead, containing two bags	0	1	0
	Roche, do.	0	1	4
Sand.	The best fresh-water sand, per double-horse cart load	0	4	10½
	Do. do. single-horse cart load	0	3	6

Calculation of the Value of a Rod or Perch of Brick-Work, reckoning the Common Place-Bricks at 36s. per Thousand, including Land-Carriage, in DUBLIN.

	s.	d.	
Two hundred and forty bricks and carriage	9	0	Bricks.
Two hogsheads of lime and carriage	2	3	Lime.
Sand, half a load	1	9	Sand.
Bricklayer's time	2	2	Time.
Labourer's time	1	2	
Profit	1	3	
	17	7	

Extra facings, with red stock-bricks to fronts, the solid of the walls being first measured as common work, the prime cost of the red stocks being *3l. 8s. 3d.** per thousand, and openings deducted as per foot superficial	0	6	Superior facings to walls in Dublin.
Extra facings with grey stock bricks, do. do., the prime cost of the bricks being *2l.* 10*s.* per thousand, at per foot superficial	0	4	Grey stocks.
Brick on edge-paving, with grey stocks, in mortar, at per yard	4	4	Paving on edge.
Do. flat brick paving, do.	3	0	Flat edge.
Brick on edge-paving, with place-bricks, in mortar	3	0	Paving in edge with place.
Flat brick paving in do.	2	3	Do. flat.
Garret sash-frames, bedded and pointed, each	1	6	Sash-frames.
Two-pair ditto, each	2	0	Two-pair.
One-pair ditto, each	2	6	One-pair.
Kitchen ditto, each	2	0	Basement.
Nine-inch, fourteen-inch, and all manner of circular, elliptical, or cambered arches, over small or large openings, are charged at per foot superficial, which, when executed with red-rubbed bricks, at £3. 8*s.* 3*d.* per thousand, is worth, per foot super	1	2	Circular, elliptical, and cambered arches, &c.
Do. with grey stocks or marls, when they are at £2. 10*s.* per thousand	0	10	Arches.
Do. with common place-bricks, when they are at £1. 16*s.* per thousand	0	8	Place-bricks.
Bird's mouth, square, squirt, cant, and splayed jambs, to quoins, &c.	0	4	Quoins, &c.
The setting of grates, building of wine-bins, &c. are valued in proportion to the workmen's time, and the worth of the materials consumed.			Grates Bins.
Tanks and Cess-pools are measured and valued in proportion to the prime cost of the bricks and extra labour.			Wells, Tanks, and Cesspools.

Value of drains in Dublin.

The value of 9-inch, 12-inch, 14-inch, and 18-inch drains are valued at per foot running measure, and the correct worth of them is ascertained by calculating the number of bricks in each foot, which, together with the value of the labour and mortar, including the fair profits thereon, are certified by valuators to be the correct worth of drains, the intrinsic value of which vary according to the prime cost of bricks, lime, and sand.

* It must be observed, that £1. 2*s.* 9*d.* is equal to one guinea Irish; and, consequently, £3. 8*s.* 3*d.* is equal to three guineas of our late currency.

		s.	d
Pointing and cleaning.	Cleaning and pointing brick fronts, including the expenses of scaffolding, are charged at per foot superficial..	0	3
Common brick-work.	Do. to common place-brick fronts..	0	5

Common stone-work. The value of common stone walls, in foundations, &c., in the capital before mentioned, are worth from 10*s.* to 11*s.* 12*s.* and 13*s.*, per perch, according to the situations or distances from the quarries.

Chimney pots. Chimney-pots are charged, according to their sizes, from 3*s.* each up to 7*s.*

Customs in different parts of Great-Britain.

General observations on customs. In order that the present work may prove generally useful, we shall subjoin the customs of several other parts of the United Kingdom; and before we conclude, think it but candid to state that, in many parts of Great Britain, the customs of measuring and valuing artificers works are not less absurd than many of those adverted to in Ireland.

Brick-work measured by the rod in England. In most of the English counties distant from the metropolis, brick walls are measured by the superficial yard, containing 9 feet, the thickness of the work being reduced to a standard of 1 brick, 1½ brick, or 2 bricks, the prices for which are regulated at per yard, according to their respective thicknesses.

Provincial customs in England, In the north of England, brick walls are measured by the yard, and valued according to the thickness of the work; the builders having a local standard thickness of 18 inches, by which they are governed, and a rod or scale of reference, comprising 49 superficial square yards, which is also adopted by the masons; but neither the standard thickness or provincial rod is abided by on all occasions: not always abided by. openings of every description are included in the admeasurements for workmanship, but not for the latter, including the materials. In valuing chimney-breasts, they measure the horizontal girths from wall to wall, and to these lengths they add the number of widths or divisions between the several flues, estimating each at three inches for the entire breadths; the before-mentioned widths being collected, the altitude of the stories are ascertained, which latter dimensions being multiplied by the former, the superficial contents are obtained, and the thicknesses averaged at nine inches.

Chimney-shafts. In estimating chimney-shafts the girths are taken all round, to which dimensions the number of widths are added, as before; and if it happens that there should not be more than one row of flues, they are estimated as nine-inch walls.

Customs of Liverpool and Wales. In Liverpool, the brick-work is measured by the superficial yard; and the same practice prevails, generally speaking, throughout that part of the kingdom. In North and South Wales, and in some of the western counties, the customs are S. Wales. somewhat different; in South Wales the standard perch is 18 feet cube for brick as well as stone-work; the value of which varies in different counties, in proportions to the facilities of obtaining bricks, stone, and lime. The following are the average prices of labour and of building materials in the counties of Pembroke and Caermarthen, in South-Wales.

Crown Memel timber, from 2*s.* 6*d.* to 2*s.* 8*d.* per foot cube. Materials in South Wales.
Oak do., string measure, 4*s.* per foot cube.
Stone delivered on the spot, 3*s.* per ton.
One ton and a half is equal to one perch.
120 gallons of lime delivered is worth 6*s.*
Bricks, delivered, are 29*s.* per thousand.
Masons' wages, per week, from 18*s.* to 21*s.* Wages of artificers.
Carpenters', Plasterers', and Bricklayers', the same.
Painters', do. 21*s.* to 24*s.*
Iron, per ton, £12. and 1*s.* carting.
Aberthaw lime-stone delivered, 4*s.* 3*d.* per ton.
Coals per ton, for burning, are 6*s.*

Bricklayers' Customs in Scotland.

Scotland: Walls, &c.

In that part of Great Britain, called Scotland, the brick-work of outside walls is measured and valued by the rood of 36 superficial square feet; and this custom is general, if not universal; the standard thickness for brick-walls being $1\frac{1}{2}$ brick, or 14 inches, thick. Walls of minor thicknesses are measured and valued by the superficial yard, and the prices are regulated in proportion to the thicknesses; and chimney-stalks, as they are called in that part of the kingdom, are estimated by their girths, the horizontal dimensions being taken all round for the lengths, and the altitudes with half the thickness for the heights, which are valued when reduced, as $1\frac{1}{2}$ brick-walls.

Chimney-breasts, fronts, and returns.

In appreciating the value of the breasts of chimnies, they measure the width of the fronts, and one of their returns for the lengths, and for the heights, as far as the works are executed with the same materials, being also of the same thicknesses, which are ascertained by measuring the projections before the faces of the main walls. The apertures for doors and windows are included in the admeasurements, which are customs similar to those practised in the northern and southern counties of Ireland, upon the improprieties of which we have taken the liberty of animadverting, under impressions that where such absurd customs are continued, the correct principles of estimating the value of builders' works cannot be conscientiously performed. (Doors and windows.)

Observations on Bricklayers' Works in the Cities of London and Westminster, &c.

Observations on brick-work in London and its vicinity.

Master-Bricklayers in the metropolis, as well as in most places, are in general men of intelligence; and their business consists chiefly in building brick walls, of various denominations, to private dwellings and public buildings, &c. They are also employed in tiling the roofs of buildings, and in paving, with bricks or tiles made for the purpose; and some of the jobbing-masters also undertake to perform common plasterers' works; but the most eminent bricklayers confine themselves entirely to their own trade, nor will they interfere with any other. But bricklayers in the country are identified not only as bricklayers but as masons, and sometimes as plasterers and slaters.

Bricklayers' materials. Labourers. Building act.

Bricklayers' materials consist of bricks, tiles, mortar, laths, nails, and tile-pins, &c., with which they are supplied while engaged at their different works by labourers, some of whom are employed in making the mortar.

Rates of buildings. District surveyors. Notices, &c. Architects, &c.

By the Building Act of the 14th of Geo. III., sect. 38, every Master-builder in London and the Parishes within the Bills of Mortality, prior to the commencement of any building within the first and seventh rates, must give twenty-four hours' notice of his intention to the district-surveyor, specifying the sort of buildings about to be erected or altered; and it generally falls to the lot of the bricklayer to give the notice required, unless an architect or surveyor is employed to superintend the execution of the proposed works.

Local act. London, Westminster, and Southwark.

It is a local act of parliament, and contains restrictions, or regulations, affecting buildings of every description, within the cities of London and Westminster, the weekly bills of mortality, the parishes of St. Mary-labonne, Paddington, St. Pancras, and St. Luke's, Chelsea; and, for the information of those who may have frequent occasion to consult the act, a copious abstract is attached to this work, as part of an appendix.

Foundations. Examination of the ground; how to try, and with what implements.

The proceedings first to be taken in bricklaying are to dig the trenches for the foundations; which being accomplished, the ground should be examined to ascertain if it is sound below the surfaces intended for the foundations, which should be done with iron crow-bars or rammers; and, if the ground should appear to shake, it should then be tried with well-sinker's tools, in order to determine whether the shakes are local or general. If the soil should prove generally firm, the looser parts, if not very deep, should be dug up until solid strata of earth or stone can be arrived at, upon which piers should be built, as hereinafter described; but, if the ground should not be very loose, it may then be made perfectly secure by ramming down large stones, closely packed together, and grouted in cement or strong mortar, of breadths at the bottoms proportioned to the intended insisting weights: this Mr. Smirke, the architect, has recently adopted at the New Post-office, in London: but, if the ground should prove to be insecure, in all such cases it should be first piled, and then planked,* to ensure the safety of the intended superstructure; or, if courses of strong Yorkshire landings are laid all round the foundations, they will answer the same purpose, and, at the same time, supersede the necessity of brick-footings, which, in many instances, are unnecessary, where the walls are of sufficient thickness, and the ground upon which the foundations are built, is secure; but, as regards footings, where they are indispensable, the last mentioned practice is now becoming very general, and, in structures of considerable magnitude, strong Yorkshire landings are introduced, at least four or five inches thick, and suitably wide.

Piers, as described subsequently. Ramming down stone as at the New Post-office. Brickfootings. Where necessary, stone footings preferable. York landings.

Rising and sloping ground.

In building upon inclined planes, or rising ground, as the ground rises, the foundations should rise in proportion thereto, in successions of level steps, ac-

* The system of piling was adopted at the New Custom-house, in London, built but a few years since; and although it has failed, we have been informed that blame, to the extent reported, ought not to be attached to the architect or the builder, as we understand the principle of piling was recommended by a late highly-respected and most eminent engineer. We lament the failure, and sincerely regret that the foundation of such a magnificent structure should have given way.

cording to the general lines of the ground, which will ensure secure berths for the foundations, and prevent the possibility of their sliding, which they are apt to do, if very great care is not taken, and especially in wet seasons, where the moisture in the foundations will cause the inclined parts to descend, to the extreme danger of fracturing the walls, and thereby destroying or very much injuring the superstructure. Stepping-in brick-work. Moisture in foundations.

Where it happens that the ground proves loose, to a considerable depth, in those places where it is intended to introduce windows, doors, and other apertures, while the sides, on which the piers must stand, are firm, it is an excellent practice to introduce inverted arches under such intended apertures. Loose ground. Inverted arch in brick-work.

Speculative opinions have been given upon the subject of inverted arches, as not being requisite under any circumstances, but where the depths of the walls below the apertures will admit of it, the reasons for introducing them cannot be resisted; inasmuch as the small bases of the piers will more readily penetrate the ground than continued bases; and, as the piers may be allowed to descend to certain degrees, so long as they can be kept from spreading, they will carry the arches with them, compressing the ground, and forcing the re-action against the sides of the inverted arches, which, if properly jointed, so far from yielding cannot fail, with the abutting piers, to operate as solid bodies. Now, if the expedient of inverted arches be not adopted, the intermediate low pieces of walling under the apertures, not having sufficient vertical dimensions, will frequently give way by the resistances of the ground upon their bases, and not only fracture the brick-work below the apertures, but likewise the window-sills; and from hence it is deemed requisite that the arches should be turned with the greatest exactness, and that parabolic curves should be introduced as being the most effectual in the re-action of the ground, their forms being adapted to the laws of uniform pressure. The beds of the piers should be as regular as possible, that is, of equal depths; for, although the bottoms of the trenches may prove to be firm, yet if they should happen to be different in depths, they will sink in proportions thereto, according to the degrees of softness in the earth; and under these circumstances the piers, on the softest ground, will sink more than those on the hardest, and thereby occasion vertical fractures in the upper parts of edifices to which such described foundations refer. Opinions on the subject. Piers to descend. Re-action of arches, operate as solid bodies. Arches turned with exactness. Beds of piers. Different depths. Softness of ground.

But, if it should happen that the solid parts of the earth in the trenches will be under the intended apertures and the softer parts of the earth, where the piers are intended to be built, the reverse of the above practice should be resorted to; *that is*, by building piers on the firm parts of the ground in the trenches, and to suspend parabolic arches between them in the transverse positions to those previously described: in the performances of which the greatest care and attention should be paid to the insisting piers; *that is*, by previously ascertaining whether they will cover the arches or not; for, if the middle of the piers should rest over the middle of the summits of the arches; the narrower the piers are, the greater should be the curvatures of the arches at their apex, or points, where the parabolic arches come in contact with the superstructure. But, where suspended arches are introduced, it must be understood that the *intrados* ought to be clear, that the arches may have their full effect; and it is also necessary to remark, that the earth on which the piers are intended to be erected should be of equal firmness, to prevent the possibility of partial or un- Solids in earth, reverse of the above practice. Parabolic arches. Insisting piers. Summits of arches. Arches in contact. Suspended arches.

Partial settlement. equal settlements, which are more likely to be productive of serious injury, than where the ground, from being uniformly soft, yields equally to the pressure of the superstructure. Now, where it is requisite to introduce stones in the manner before described, to assist in rendering the foundations secure, the stones should be previously hammered or broken to pieces, in the manner adopted in Mac-Adamizing the public roads, in order that, when compressed together, and grouted in cement or mortar, they may form entire masses or substances of stone, which cannot be separated by any superponderant matter; and, in ordinary cases, the lower beds of stones should project about one foot on each side of the intended walls; upon which a series of courses should be laid so as to bring the upper beds of the stones upon equal levels with those of the trenches, gradually diminishing with the alternate layers of stones until they are level with the bottom of the general intended foundations, and upon which should be laid and bedded, in good mortar, strong Yorkshire stone landings of large dimensions, in order that, where the foundations are doubtful, every possibility of danger may be entirely removed before a single brick or stone is laid.

(Margin: Stones as before. Grouting in cement. Footings of stones. Upper beds of stones. Bottom of foundations. York landings.)

To estimate weights, numbers, and measures. In estimating admeasurements to ascertain the correct value of brick-work, the subsequent memoranda respecting weight, number, and measure, of materials, it is presumed, will be found generally useful. We shall, therefore, commence our undertaking by preparing the mind to take a view of the materials before they are converted; as also of the given quantities which will be requisite to perform given ratios, allowing liberally for waste.

Feet super of brick-work. A superficial foot of reduced brick-work will require 17 bricks.

A superficial foot of marle-facing will require 8 bricks.

Gauged arches. A superficial foot of gauged arches will require 10 bricks.

Squares. 100 superficial feet is equal to one square of tiling.

Do. of plain tiling. One square of plain tiling will require 800, at a 6-inch gauge.

Ditto 700, at a 7-inch gauge.

Ditto 600, at a 8-inch gauge.

General observations on tiling. Kirbed roofs. Observe.—*The distances between the laths will entirely depend upon the pitches of the roofs, and will, in degrees, require, according to circumstances, 6-inch, 7-in. and 8-in. gauges. For example, kirb-roofs will require gauges of 7½-in. or 8-in. in the kirbed parts; and in the upper parts, 6-in., 6½-in., or 7-in., the distances being less as the angles of elevations are less.*

Bundles of laths. A square of plain tiling will, on most occasions, require a bundle of laths; but this will entirely depend on the pitch of the roof.

Lime. Two bushels of lime and one of sand are also deemed requisite for a square of tiling, with a peck of tile-pins.

Retailing of laths. The laths for tiling are retailed by lath-renders, at per bundle, and comprise those of 3, 4, and 5 feet lengths.

3 Feet laths. The 3-feet laths are 8 score to the hundred, or 160 laths.

4 Feet do. The 4-feet laths are 6 score to the hundred, or 120 laths.

5 Feet do. The 5-feet laths are 5 score to the hundred, and equal in length to 500 feet running measure.

Four-penny nails. The nails used in lathing are those which are denominated *four-penny*.

The latter are purchased by the long hundred of 120, and retailed at the short hundred, equal to *ten* times *ten*.

The rates of prices for nails are regulated by their names: for example, fourpenny nails are charged at *four-pence;* and in like manner for the residue, known by the pence they are charged at.

Quantities required. The quantity of nails required to a bundle of 5-feet laths will be about 500.

6-feet laths. Ditto to a bundle of 6-feet laths 600.

Paving bricks. No. 32 paving-bricks laid flat are required to pave one yard, the bricks being 9 inches long by $4\frac{1}{2}$ inches wide.

No. 82 paving bricks, laid on edge, are required to pave one yard, bricks 9 inches by $1\frac{3}{4}$ inch.

Stocks, &c. No. 66 common stock-bricks, laid on edge, are required to pave one yard, bricks $8\frac{3}{4}$ inches by $2\frac{1}{4}$ inches.

No. 36 common stock-bricks laid flat are required to pave one yard, bricks $8\frac{3}{4}$ inches by $4\frac{1}{4}$ inches.

Dutch paving-bricks, or clinkers, are $6\frac{1}{4}$ inches long, 3 inches wide, and $1\frac{1}{2}$ inch thick, and weigh, each, on the average $1\frac{1}{2}$ pound.

Stock-bricks are $8\frac{3}{4}$ inches long, $4\frac{1}{2}$ inches wide, and $2\frac{1}{4}$ inches thick, and, on the average, they weigh 5 pounds *Avoirdupois.*

Rod of brick-work, &c. 306 cubic feet are estimated to be equal to one rod of reduced brick-work, which is produced by multiplying 272 by 1 ft. $1\frac{1}{2}$ in., the presumed length of one brick and the corresponding half of another, which is the standard for rods of brick-work in the Cities of London and Westminster, and parts adjacent; but this measure must not be considered universal, or as applying generally to the United Kingdom. And 4,500 bricks are considered sufficient to execute a rod, allowing for waste; and, to reduce the cubic feet of brick-work to the standard thickness, multiply by 8 and divide by 9, and that product divided by 272, will produce the number of rods reduced to $1\frac{1}{2}$-inch brick, of the London standard measure.

Pan-tiling. A superficial square of pan-tiling will require 180 tiles, laid to a 10-inch gauge.

Pan-tile laths. The square will also require a bundle of laths, which consists of 12 laths, 10 feet long, $1\frac{1}{2}$ inch wide, and 1 inch thick.

Plain laths. Plain tile laths are about $1\frac{1}{2}$ inch wide and 1 inch thick.

Pan-tiles. Pan-tiles are $13\frac{1}{2}$ inches long, $9\frac{1}{2}$ inches wide, and half an inch thick.

The weight of a pan-tile is about 5 pounds.

Plain tiles. Plain tiles are $10\frac{1}{2}$ inches long, $6\frac{1}{4}$ inches wide, and nearly three-quarters of an inch thick. Their weight is nearly half the weight of pantiles, viz., $2\frac{1}{2}$ pounds, or thereabout.

Weight, per square. The exact weight, per square, of plain tiling may be ascertained by weighing several intended to be used; and where it is apprehended that the walls may not be suitably strong to carry plain tiling, the weight of the tiles should always be ascertained, in order that the roofs may be framed accordingly. The weights of tiles differ according to the manner in which they are made, as well as from the temperature or quality of the clay.

10-inch tiles. No. 15 ten-inch tiles will pave a yard, each tile being $9\frac{1}{2}$ inches square, 1 inch thick, and weighing 9 pounds, or thereabout.

12-inch tiles. No. 10 twelve-inch tiles are required to pave a yard, each tile measuring only $11\frac{1}{2}$ inches square and $1\frac{1}{2}$ inch thick; weight about $12\frac{1}{2}$ pounds.

Common paving bricks. Common paving bricks are 9 inches long, $4\frac{1}{2}$ inches wide, and $1\frac{3}{4}$ inch thick, each brick weighing 4 pounds, or thereabout.

Rods of brick-work in London.

The standard measure for brick-work in London is derived from the English perch or rod, identified as equal to 16 feet and one half of a foot, which, being multiplied by the same numbers, produces 272 feet and three inches, which are equal to one superficial square rod, as per example.

Example.

ft.	*in.*
16	6
16	6
96	0
16	0
8	3
8	0
272	3

On the method of measuring brick-work.

The odd three inches are never taken into account, as in general calculations they would create trouble, without producing any satisfaction. And as the fractional parts are only three-twelfths of a foot, they are not worth taking any notice of; 272 feet are, therefore, recognized as the standard number of superficial feet for a rod of brick-work, reduced to the presumed thickness of a brick and a half, which should be equal to 13½ inches; but as the bricks made in the vicinity of London, when burned, seldom average more than 8¾ inches, a brick and a half is equal to only thirteen inches and *one-eighth* part of an inch, wanting three-eighths of the required thickness; consequently, our principle of measuring brick-work is NOT STRICTLY CORRECT. Brick-walls should, and ought to be, measured by their actual thicknesses, in cubic feet and inches, and subsequently reduced to rods, by which mean they would be accurately measured and fairly appreciated. Walls are frequently thicker than what they are represented to be, by the number of bricks and half-bricks stated to be in the thicknesses. Of course, Master-Bricklayers are not always justly paid for the solid contents of the walls which are built by their workmen, including the mortar, and which, in point of fact, as regards the equity of admeasurements, and the honest claims of Bricklayers, is one of those customs which require fair and unprejudiced investigation: at any rate, the practice of regulating, or of finally settling, the thicknesses of walls, by the exact sizes of the bricks described, must be erroneous, as the bricks when burned seldom or ever correspond with the sizes adverted to, of 9 inches long, 4½ inches wide, and 2½ inches thick. Presuming, however, that the standard thickness of brick-work is correct, at 13½ inches, if 272 feet are multiplied by the former, they will produce 306 cubic feet, which are equal to the arithmetical numbers contained in a rod of reduced brick-work, as per example.

Average size of bricks made in London.

Masters frequently not paid for the solid contents of walls.

Cubical feet in a rod.

Example.

ft.	*in.*		
272	0		
1	1½		
272	0		
22	8	0	
11	4	0	0
306	0	0	0

On the average quantity of bricks in a rod.

The calculations of scientific practical men are, that 4500 bricks are consumed on the average in building a rod of brick-work, the cubical content of which is 306 feet. The number of bricks mentioned may serve as general guides to estimators; but the actual quantities of bricks consumed in rods of brick-work will entirely depend upon the manner in which the works are executed, that is, upon the closeness of the joints and the sizes of the bricks; 4300 in various sorts of walls are sufficient, whereas 4600 in many instances are insufficient.

Nett value of brick-work.

Place, grey-stocks, and marls.

Difference in value in various parts of the metropolis.

Upon mature reflection, therefore, it will be presently seen that the nett value of brick-work will depend upon contingencies, arising out of different causes; with which valuators should be informed previous to their prices being finally adjusted. If walls are executed entirely with place-bricks, the prices should be proportioned to the value of the materials; and, in like manner, if with grey-stocks, or with component parts of the former, then according to their respective ratios of materials; and if faced with the *best* or *second marls*. The quantities of works should be all first measured, as of one denomination, and subsequent prices allowed per foot superficial for extra facings, or else the quantities of superior walling should be deducted from the former, and the same quantities added, as works consisting of more valuable materials, including superior workmanship. And, in taking into consideration the value of brick-work in the metropolis, care should be taken to settle the prices upon such equitable principles, as to embrace the extra cartage on bricks, including turnpikes, and all manner of unavoidable expenses, allowing at the same time 20 per cent. upon the average of the prime cost, for profit.

Lime, sand, and mortar

In *Lime Measure*, 100 pecks are estimated as equal to what is called a *Hundred of Lime*; the former and latter of which are equal to 25 striked bushels, and $2150\frac{2}{5}$ cubic inches are equal to eight gallons, the latter of which is equal to a bushel, Dry Measure; and $262\frac{4}{5}$ cubic inches are equal to a gallon.

Cubic feet in a load of mortar.

In reference to mortar, 27 cubic feet are considered equal to a load, in which should be incorporated a half hundred of lime, with proportionate quantities of sand, the ratios of which should be regulated by the richness of the lime. 1134 cubic inches are equal to a hod of mortar, 14 inches long, 9 inches broad, and 9 inches deep; and 2 hods of mortar are nearly equal to a bushel.

Weight of sand, clay, and earth.

A ton weight of common sand is equal to $23\frac{1}{2}$ cubic feet; a ton of clay to $17\frac{1}{3}$ cubic feet; and a ton of common earth to 18 cubic feet.

Of bricks.

A ton weight is equal in weight to 454 stock bricks; and 2 tons 4 cwt. 0 qrs. and 2 lbs. are equal in weight to 1000 bricks. The subsequent calculation shews the weight of a rod of brick-work.

Of a rod of brick-work.

	tons.	*cwt.*	*qrs.*	*lbs.*
Weight of 4500 bricks	9	18	0	9
Do. of 81 cubic feet of sand	3	8	3	20
Do. of 40 feet 6 inches do. of chalk-lime	2	0	2	0
Weight of a rod of brick-work	15	7	2	1

Of tiles.

1000 Plain tiles, weigh	1	0	2	16
Do. pan-tiles	2	1	3	7
100 12-inch paving do.	0	10	3	21
100 10-inch do.	0	7	2	16

Measures of sand, &c.

One cubic yard is equal to 18 heaped bushels of sand; or, with 22 striked bushels, are estimated as single loads.

Two cubic yards are equal to 36 heaped bushels of sand; or, with 44 striked bushels, are estimated as double loads.

54 Heaped bushels of sand, or 3 single loads, are required for a rod of brick-work, mixed with chalk-lime.

63 Heaped bushels of sand, or $3\frac{1}{2}$ single loads, are required to a rod of brick-work, if executed with stone-lime.

A bushel is nearly equal to 1 foot 3 inches cubic, or with $2150\frac{2}{5}$ cubical inches.

Quantities of mortar in a rod.

To execute a rod of brick-work, containing 306 cubic feet, built in the ordinary manner, it will require 184 hods of mortar.

Brick-work in Roman cement, in cubic yards. Bushels of cement.

To execute a rod of brick-work with Roman cement, it will require from 65 to 70 bushels, mixed with equal portions of sand; and proportionately, per cubic yards or per cubic feet. For example, If it be required to ascertain how many bushels will execute a cubic yard, then say, if 306 cubic feet requires 70 bushels, how many will 27 cubic feet require?

The work.

cubic feet.		*bushels.*		*cubic feet.*
306	:	70	: :	27
				70

306) 1890 ($6\frac{1}{6}$th bushels.
1836

. . 54 = to $\frac{1}{6}$th or thereabout.

Quantities of cement, per yards super.

One bushel of Roman cement, used with judgment, upon walls suitably prepared for stucco, will be sufficient to cover from three to four yards; that is, if mixed or equalized with quantities of clean, sharp, quick, river, drift, or sea, sand.

Mortar in a rod, two of sand to one of lime. Solid contents of mortar and bricks in a rod.

150 Pecks, or one hundred and a half, of common chalk-lime is requisite to execute a rod of common brick-work, which will require to be incorporated with double the quantity of sand, making altogether $4\frac{1}{2}$ hundred, the cubical contents of which will be equal to $4\frac{1}{2}$ times 27 cubic feet, or $4\frac{1}{2}$ loads of mortar; the solid contents of the mortar will therefore be 121 feet 6 inches, and the solid contents of the bricks 184 feet 6 inches, making altogether 306 cubic feet; and from hence it appears that, in brick-walls, *one-third* is very nearly mortar, and the remaining *two-thirds* bricks.

Stone, lime, &c. Mortar to 100 bricks.

100 Pecks, or one hundred of the best stone-lime, will be sufficient to execute a rod of brick-work, with proportionate quantities of good, sharp, quick, lively sand; and two bushels of lime, incorporated with proportionate quantities of sand, will make mortar sufficient for 100 feet of plain tiling; and four hods of mortar, or thereabout, are required to lay 100 bricks.

Square boxes, 3 ft. by 3 feet. 1 Cubic yard. Cubic inches in a yard.

The measures for ascertaining the ratios of lime are square boxes, 3 feet wide, 3 feet deep, and 3 feet long, which, filled with lime, strike-measure, will contain one cubic yard, 27 cubic feet, or 46,656 cubic inches; the contents of which are respectively equal to $21\frac{1}{5}$th bushels, dry-measure.

	Cwt.	qrs.	lbs.
1 Square of plain tiling will weigh, that is reckoning 800 to the sq.	16	2	2
1 Do. of do. reckoning 700 to the square	14	1	22
1 Do. of do. reckoning 600 to the square	12	1	15
1 Do. of pantiling, reckoning 180 to the square	7	2	13

Bricks, for the general purposes of constructing walls, claim a decided superiority over stone, or any other material used for walling, not only as being lighter, and more easily handled, but likewise on account of their porosity, which facilitates their union with mortar, and which renders them less liable to retain or attract moisture. Bricks superior to stone, for general purposes.

In most parts of England where bricks are made, the sizes of the moulds are $9\frac{1}{2}$ inches in length, 5 inches in breadth, and $2\frac{3}{4}$ inches in depth, and they are generally made of the above dimensions, in expectation that the bricks, when burned, will be 9 inches long, $4\frac{1}{2}$ inches broad, and $2\frac{1}{2}$ inches thick; but, when burned, they seldom prove to be more than $8\frac{3}{4}$ inches long, $4\frac{1}{4}$ inches wide, and $2\frac{1}{2}$ inches thick, or less. Their degrees of shrinking are various, which arises chiefly from the purity or quality of the different sorts of clay, as well as the intensity of the various degrees of heat to which they are exposed, by being burned in clamps; and, from these reasons, bricks, which have been burned in kilns, are more highly appreciated; inasmuch as the mode of burning them, in the latter way, insures an equalization of heat, not to be commanded in burning bricks in open clamps, exposed to all the inclemencies of the weather, which subjects them, during the process of burning, to be injured in various degrees by the changes of the weather, which, more or less, promotes successive inequalities of heat in the operation of burning, especially in windy weather; hence it is that the bricks burned in clamps are of various sorts: those which are the *least* burned are called *common place-bricks;* those which are *well* burned, the *best Grey Stocks;* and the next in gradation, the *Second Grey Stocks,* and with these bricks the major part of the houses and public edifices, in London, are built. Sizes of bricks in different parts of England. Bricks in London are not full size; shrink in burning. Clamp-bricks. Kiln-burned do. Burning of bricks. Various sorts of bricks in clamps; their description.

To the above-mentioned bricks may be added those which are called *Marls;* these are prepared and tempered with great care, but the clamps in which they are burned are similar to those for common bricks, though greater caution is used in burning them. The clearest and best coloured *Marls,* which are of a pure yellow hue, are called *Firsts,* and are selected as cutting-bricks, for arches, door-ways, windows, and quoins, for which purposes they are rubbed and reduced to their proper forms and dimensions. The next, in degree of quality, are called *Seconds,* and are used chiefly in facing the principal fronts of buildings; their colour, also, is yellow, which, added to their pleasing appearance and superior durability, have caused them to be classed as the first-rate sort of bricks, for facing the fronts of public and private edifices. The best *Grey Stocks* are something like the *second Marls,* but inferior in quality, they are nevertheless highly appreciated; and, in facings for the fronts of buildings, if they are selected with care, and uniformly built in a masterly style, they produce the most agreeable effect; nor are the seconds less applicable to flank and *rere* walls, executed in like manner, each of which, in proportion to the respective value of the materials, should be estimated accordingly. Marls, fine sort of bricks; great caution in making. Marl facings and gauged arches. Second marls, colour fine yellow, used in fronts. Grey stock fronts, &c. Flanks and reres.

English and Flemish bond, how known. The manner of laying the bricks. Headers and stretchers.

Bond, in brick-work or masonry, implies the disposition of bricks or stones built in walls, upon such principles as to prevent the vertical joints coming in contact. *English* and *Flemish Bond*, in brick-work, if properly executed, may be known by the manner in which the bricks are laid: when they are laid longitudinally, they are called *stretchers;* and, when laid transversely, they are called *headers*. When disposed so that every alternate course consists of headers only, and stretchers only, it is *English Bond;* and one header between every two stretchers, and one stretcher between every two headers, is *Flemish Bond.*

Red bricks.

Red Stock Bricks are generally made in the country, and are burned in kilns; their colour arises chiefly from the nature of the clay they are formed with, which, in general, is pure. The best sort are used as cutting-bricks, and are called *Red Rubbers.* The Grey Stock Bricks, made in the neighbourhood of London, harmonize much better with the colour both of stone and paint, and by persons of refined judgment are much preferred. At Hedgerly, a village near Windsor, Red Bricks are made, which are about $1\frac{1}{2}$ inch thick, they are of a firm texture, and will stand the greatest violence of the fire; they are commonly called Windsor, or Fire-bricks, and are used in building ovens, &c.

Grey stocks, near London. Fine bricks, commonly called Windsor.

Paving-bricks, their sizes.

Paving Bricks are of the same dimensions as Windsor bricks, which are 9 inches long, $4\frac{1}{2}$ inches broad, and $1\frac{1}{2}$ inch thick.

Paving-tiles, their sizes.

Paving Tiles are also used, which are made of the purest and strongest clay, and are of a red colour; the largest are about 12 inches square, and $1\frac{1}{2}$ inch thick: the next sizes are what are called 10-inch tiles, but when burned, are only about 9 inches square, and $1\frac{1}{4}$ inch thick.

Coping-bricks.

Coping Bricks are also made, and are used for the purposes which the name implies.

Concave-bricks, their uses.

Concave or Hollow Bricks are also made, which are flat on one side, like common bricks, and are hollowed on the reverse side, and are used for drains and water-courses.

Dutch bricks, their uses.

Dutch or *Flemish* Bricks are those before mentioned, which are used in paving stables, likewise in lining soap-boilers' cisterns, &c.; their sizes have been already described.

Feather-edged bricks, their uses.

Feather-edged Bricks are also made, which are of the same sizes as the common bricks, but are thinner on one side than the other, and they are chiefly used for pinning up brick panels in timber buildings.

Brick-noggings, on edge or laid flat.

Brick-Noggings are thin walls or partitions, constructed with vertical posts, framed into top and bottom plates, and the intervals filled in with brick-work, either with bricks set on edge, or laid flat and set in mortar; the value of which it is usual to ascertain at per yard.

Brick cornices, valued by the run.

The most pleasing cornices may be formed in brick-work by a judicious disposition of the bricks, and frequently without cutting them; the expense of which should be ascertained by the foot run.

To measure brick-footings; average thickness.

The proper way of measuring the footings to brick-walls, is to multiply the length and the height together, then to multiply the product by the number of half-bricks in the averaged thickness, and ultimately divide the product by 3, and the quotient will be the answer required, in reduced feet.

Computations.

To compute the number of rods contained in pieces of brick-work, the following rules should be observed, as in part before explained.

Rule 1.—Provided the walls are at the standard thicknesses, first divide the area of the wall by 272, and the quotient, if any, will be the answer in rods, and the residue, if any, the number of feet; but, if the walls are less or more than $1\frac{1}{2}$ brick in thickness, multiply the area of the wall by the number of half-bricks in length, then divide the product by 3, and the wall will be reduced to the standard of $1\frac{1}{2}$ brick; which, being divided by 272, the quotient will be the number of rods required.—*See the Example beneath.*

To compute rods of brick-work.

Rule 2.—Find the number of cubic feet contained in the brick-walling, as shown in the first example beneath, and divide that number by 306, and the quotient, if any, will exhibit the number of rods, and the residue, if any, the number of cubic feet.

Another method.

Rule 3.—First, multiply the number of cubic feet in brick-walling by 8, then divide the product by 9, and the quotient will exhibit the area of the wall at the standard thickness; which, being divided by 272, the quotient will produce the number of rods and feet, as before explained.

Another method.

The explanation of the last Rule cannot be better exemplified than by the annexed, $\frac{8}{9\times272}=\frac{1}{9\times34}=\frac{1}{306}$, which is the divisor of a rod, without reference to the standard.

Elucidation of the principle.

Example.—The length of a wall being 85 feet long, 17 feet high, and the thickness equal to the length of two bricks and a half, how many rods of brick-work are contained in the wall?

Examples of the three methods.

Operation by the first method—

Example the first.

```
       feet.
        85
        17
       ----
       595
        85
      -----
      1445
         5 number of half-bricks.
      -----
   3) 7225
      -----
 272) 2408 (8 rods 232 feet.
      2176
      -----
       232
      =====
```

Operation by the second method—

Example the second.

```
      feet.
       85
       17
      ----
      595
       85
     -----
     1445
        1  10  6
     -----------
     1445
```

```
(The work continued)  1445
                        722   6
                        481   8
                         60   2   6
                     ─────────────
                  306)2709   4   6 (8 rods 261 feet.
                      2448
                      ────
                       261
```

Operation by the third method—

Example the third.

```
        85
        17
       ───
       595
       85
      ────
      1445
         1 10  6
      ──────────
      1445
       722   6
       481   8
        60   2   6
      ─────────────
      2709   4   6
                 8
      ─────────────
    9)21675  0   0
      ─────────────
 272)  2408  4   0 (8 rods, 232 feet.
       2176
       ────
        232
```

To measure angle-chimnies; taking the dimensions; the triangles on the super to the solids. First and second rules.

When chimnies are built in the angles of rooms, to find their contents, multiply the superficial areas of the triangles by the altitudes of the walls; and, in proceeding to take the dimensions, produce the counterparts of the triangles on the floors of the rooms, which may be easily accomplished with the measuring-rods, or by lines chalked on the floors, then will the triangles on the floors be equal to the triangles of the chimnies. To find their contents, multiply the bases by half the perpendiculars, and the areas of the triangles will be found; then proceed as first described, and subsequently by the preceding rules, to ascertain the quantities of rods, &c.

Angle-chimnies, with projections; how to take the dimensions.

It sometimes occurs, that angular chimney-breasts do not intersect the adjoining walls, but project from the faces of those adjacent, by returning two vertical planes of equal breadths, each at right angles with the adjacent walls. Now, in these cases, the triangular prisms should be measured as before, but as the interior of such walls is frequently constructed with burrs, inferior sorts of bricks, the parts adverted to will then consist of rectangular prisms, and

nothing more is requisite than to measure them as such, taking care to deduct the vacuities of the fire-places.

Lineal measures for quoins, &c.

In the preceding instances to the latter, where the planes of the breasts intersect the sides of the rooms, lineal allowances, *per foot*, ought to be made for the inside splays; and, in the cases where the planes of the breasts do not intersect the adjacent walls, two outside splays and two internal right-angles are unavoidable. Now, in these, and in similar instances, there ought to be allowances made for outside splays, as well as internal right angles, per foot run, each according to the differences in the workmanship. It is not attempted to be insinuated, that these allowances could be sanctioned while the present system of valuing brick-work is in fashion, the prices for which are presumed to include delays of every sort, but without any apparent foundation in reason. It would be desirable if the prices, per rod, could be reduced in satisfactory degrees, that each sort of work might be valued by its common measure, in proportion to the time required to perform given portions.

Intersections.

Outsidesplays, as well as internal angles, &c.

Present mode of measuring brick-work in London unsatisfactory.

To value party-walls.

To compute the value of party, flank, and partition, walls, with flues, &c. In the first place, proceed to find the cubical contents of the interior of the several parts of the walls in feet, according to the figures into which they may be resolved, from which deduct the vacuities, and multiply the residue by 8, and divide by 9 as before explained, and the work will be reduced to the standard rod.

Openings, &c.

Flues included in measurement.

In measuring walls containing chimnies, it is not customary to deduct the flues. This practice may have the appearance of being incorrect; but, taking into consideration the extra labour in forming the flues, and the expenses of pargetting, the allowance is quite reasonable.

Further remarks on lineal measures to quoins, &c.

In reference to the lineal measures of quoins, it is with regret observed, that the practice is not general; and, as far as we know, has only as yet taken place in outside and inside splays, and in the angles of quoins. We allow that any innovation, not founded in reason, ought to be rejected; but, convinced of the justice of the proposed system, we have ventured to introduce the subject, under conviction that the principle ought to be adopted and followed in every case, whether the quoins are vertical, horizontal, or curved, and that suitable prices should be affixed to each description of quoins, whether external or internal, as the trouble in executing external angles is greater than internal angles, greater in oblique than in right angles, greater in curved quoins than in straight ones, and far greater in quoins where the angles are perpetually variable than in curves where the angles are uniformly the same.

Quoins, vertical, horizontal, &c.

General principles for valueing walling, with allowances in lineal measures.

To value the solid contents of walls in buildings, first reduce all the parts into rectangular prisms, and then find the solid contents of each prism; apertures, therefore, of any consequence, should be deducted from the measures, and allowances made, in lineal feet, upon all the angles, as described, for the trouble of plumbing, levelling, and straightening: it is true, that great lengths of walling require numerous intermediate plumbings; but then, as they are regulated upon the faces, the trouble is small in comparison to what is required in vertical terminations; and, as the plumbings referred to are made at regular distances, the parts of the wall may be said to be uniformly built; and the same in all equal lengths of wall, and the time proportioned to the quantities under the same

Solid contents fair ratios.

circumstances of height and thickness; and therefore the areas, or solid contents, may be presumed as fair ratios for the prices. And, moreover, it is manifest, that the greater the number of openings, in the same lengths of walls, the more trouble they will occasion to the workmen, the differences in time being required to form the sides of the apertures. In these cases, therefore, the time computed for the completion of walls of given dimensions, and of the same quantities of work, must depend upon the number of quoins that are to be built; and, consequently, cannot be determined by the solid contents of the walls: but jointly they may be ascertained, that is, by making equitable allowances for the lineal quantities of angles; for the solid contents are not as to the time, when the number of quoins are increased, and, consequently, the prices cannot be as to the time; but the prices may be made equivalent by fair allowances for the increased number of angles.

General observations on measuring brick-work, &c.

Construction of quoins.

It is also manifest, that, in the construction of quoins, as long as the bricklayers continue at the same rate of work, the lineal quantities are in the same *ratio* as to the time; and hence it is that the lineal measures ought to be taken as fair representations of the value of the quoins.

In carrying up walls of the same horizontal lengths, without any openings, the quantities of work performed by the same number of bricklayers are equal in equal times; but, as the work proceeds, additional labourers are requisite, as the height increases, to supply the bricks and mortar. In these instances, also, the quantities of surface are fair representations as regards the bricklayers; but the prices for the work ought to encrease as the work proceeds, and the encrease should be in terms of arithmetical progression; for, suppose the materials at the foot of the scaffold, and the scaffolding erected at regular heights, it is evident that, whatever time the labourers require to mount the first scaffold, it will require double the time for the second, triple for the third, and quadruple for the fourth. An increase, also, to the prices for brick-work, for the use of scaffolding, should be added in gradations, with the extra charges for labourers, and in proportions as the works are carried up. Now, as to the value of the labour, as regards the bricklayers, it may be fairly computed by the quantities of surface in walls of equal thicknesses; but advanced prices ought to be allowed for labourers and scaffolding.

Quantities of surface.

Scaffolding.

Labourers' time in proportion.

Cores and faces of walls.

As more time is required to perform the same quantities of work in the faces of walls than in their cores, on account of plumbing, the trouble of erecting the walls will be greater in proportion than in those which are thicker; and from hence it may be questioned how far the practice of reducing walls to a brick and a-half thick is correct. The subsequent method appears to be more rational: First, to measure the solid contents of the entire, and value the same at per rod, then to measure the surfaces of the walls, at certain rates per foot superficial, and to value the same according to the qualities of the works. Equal quantities of core may be built in equal times, and, likewise, equal quantities of surface in equal times; but equal quantities of core, and equal quantities of surface-work, cannot be performed by workmen in equal times; and therefore the standard measure is not founded upon equitable principles: but in walls where great neatness is not required, perhaps the differences of time to perform equal quantities of work, in walls of different thicknesses, is not worth regarding.

Quære, Is the present mode of measuring brick-work correct?

Standard measure not strictly just.

The preceding arguments would not have been so much insisted upon, had it not been that many of the common modes in practice, in London and its vicinity, are not reducible to any principles, and are therefore incomprehensible to all. When men, who are mere followers of custom, affect to be profound in the knowledge of rules which have not any existence, except in their own conceit, who have acquired facilities in their professions, and are reluctant to be at any farther trouble, will strain every nerve to protect antient customs, with all their absurdities; and, instead of expelling falsehoods, will declaim loudly against every rational improvement as dangerous innovation: it is the duty of professional men to exert their influence in the developement of scientific truth for the benefit of mankind; and as, in every profession, men of reflection are to be found, we hope the subject will attract the attention of those whose recommendations cannot fail to prove highly satisfactory to all parties concerned in building.

General observations on the methods now in common use.

To ascertain the price per rod for brick-work, the first step to be taken is to consider how many bricks are requisite to perform the same; secondly, the sizes and qualities of those bricks, and how many of each sort have been, or are likely to be, consumed; as likewise their prime cost, including the carriage or freightage, or both together, with the value of the sand and lime; as also the labour, including scaffolding, and a fair profit upon the entire cost out of pocket. The ultimate value per rod will also depend upon the goodness of the workmanship, and the average value of the labour, including the use of the scaffolding; for, in building foundations and party-walls, which are usually done with inferior bricks, the bricklayers may each lay from 1500 to 1600 bricks *per diem*; in garden and in boundary prison-walls, where great care is requisite, not more than 1000 *per diem*; and in building walls, faced with grey stocks, of an even and uniform colour, where the utmost care and attention is requisite, bricklayers will not, perhaps, lay more than 500 *per diem*. To render justice to the employed, all these matters should be alternately taken into consideration in affixing proportionate prices to brick-work, whether the work be executed in London, or in any other part of these dominions; the following examples will serve to illustrate the subject, so that it may be clearly comprehended.

On the valuation of brick-work, including freightage, land-carriage, &c.

The number of bricks that may be laid each day.

Suppose a party-wall to be built with sound grey-stocks and common place-bricks, estimating 4500 bricks to each rod, and 2250 bricks of each sort, what will be the average value?

EXAMPLE.

Estimate of a rod of brick-work in a party-wall, half grey-stocks and half place.

	£.	s.	d.
2250 grey-stocks, at 42*s*. per thousand	4	14	6
2250 place-bricks, at 32*s*. do.	3	12	0
150 pecks of lime, at 14*s*. per hundred	1	1	0
300 pecks of sand, at 5*s*. do.	0	15	0
5 days, a bricklayer, at 5*s*.	1	5	0
5 days, a labourer, at 3*s*.	0	15	0
Use of scaffolding	0	4	0
	£.12	6	6
Twenty per cent. profit	2	9	3½
	£.14	15	9½

Detail value of a rod of brick-work in a party-wall, all place-bricks.

Estimate of a rod of brick-work in a party-wall all place-bricks.

	£.	s.	d.
4500 place-bricks, at 32*s.* per thousand, which includes carriage....	7	4	0
150 pecks of lime, at 14*s.* per hundred....	1	1	0
300 pecks of sand, at 5*s.* do....	0	15	0
5 days, a bricklayer, at 5*s.*....	1	5	0
5 days, a labourer, at 3*s.*....	0	15	0
Use of Scaffolding....	0	4	0
	£.11	4	0
Twenty per cent. profit....	2	4	9½
Total value....	£.13	8	9½

Detail of a rod of brick-work, in which all grey-stocks are used.

Estimate of a rod of brick-work with all grey-stocks.

	£.	s.	d.
4500 grey-stocks, at 42*s.*....	9	9	0
150 pecks of lime, 14*s.* per hundred....	1	1	0
300 pecks of sand, 5*s.* do....	0	15	0
5 days, a bricklayer, 5*s.*....	1	5	0
5 days, a labourer, 3*s.*....	0	15	0
Use of scaffolding....	0	4	0
	£.13	9	0
Twenty per cent. profit....	2	13	9½
	£.16	2	9½

Detail of a rod of brick-work, in which one-third place-bricks, one-third grey-stocks, and one-third second-marls, are used in fronts of houses, &c.

Estimate of a rod of brick-work, one-third place, one-third grey and one third second marl bricks.

	£.	s.	d.
1500 second-marls, at 84*s.* per thousand....	6	6	0
1500 place-bricks, 32*s.* do....	2	8	0
1500 grey-stocks, 42*s.* do....	3	3	0
150 pecks of lime, at 14*s.* per hundred....	1	1	0
300 pecks of sand, at 5*s.* do....	0	15	0
Average time of bricklayer, 6½ days, at 5*s.*....	1	12	6
Do. of labour, 6½ days, at 3*s.*....	0	19	6
Use of scaffolding, average per rod....	0	4	0
	£.16	9	0
Twenty per cent. profit....	3	5	5½
	£.19	14	5½

Detailed value of a rod of brick-work, in front walls, in which one-third best picked marl-stocks, and two-thirds best grey-stocks, are presumed to be used, and the work done in the best manner.

Estimate of a rod of brick-work, one-third best marls and two-thirds stocks.

	£.	s.	d.
1500 best *picked* marl-stocks, at £7. per thousand, delivered	10	10	0
3000 best *grey*-stocks, at 42*s*. do. do.	6	6	0
150 pecks of lime, 14*s*. per hundred	1	1	0
300 pecks of sand, at 5*s*. do., or per load	0	15	0
6½ days, a bricklayer, at 5*s*. per day	1	12	6
6½ days, a labourer, at 3*s*. per day	0	19	6
Use of scaffolding, &c.	0	4	0
	£.21	8	0
Twenty per cent. profit	4	5	7¼
	£.25	13	7¼

Detailed value of a rod of brick-work, in which it is presumed the best picked marls are entirely used, to ascertain the value per foot cube, as a standard price for facings, performed in the very best manner.

Estimate of a rod of brick-work, all best bricks.

	£.	s.	d.
4500 best *picked* marls, at £7. per thousand	31	10	0
150 pecks of lime, at 14*s*. per hundred	1	1	0
300 pecks of sand, at 5*s*. do.	0	15	0
6½ days, a bricklayer, at 5*s*. per day	1	12	6
6½ days, a labourer, at 3*s*. do.	0	19	6
Use of scaffolding, &c.	0	4	0
	£.36	2	0
Fifteen per cent. profit	5	8	3½
	£.41	10	3½

ft.		£.	s.	d.		ft.
306	:	41	10	3½	:	1

Ans. 2*s*. 9*d*. per foot cube.

Explanation of the preceding example.

One shilling and four-pence halfpenny will therefore be the price for facings, reckoning the same at 6 inches thick, which will include headers and stretchers; and half that price, namely, 8¼*d*. will be an equivalent for fronts faced with seconds, that is, per foot super, and 6 inches thick, being an average thickness, when front brick walls are measured, including all materials, as if built with place and grey-stocks, and with best picked marl facings, the latter quantities must be deducted from the former, if the foregoing prices are added for extra facings And the same rules should be observed as regards all manner of superior facings, in order that the value of the materials may be progressively analysed. It will require nearly 4650 bricks to execute a rod of brick-work with marls; the price of the brick-work must, therefore, be proportioned to the difference, with the utmost exactness.

		s.	d.
Prices of facings when the common brick-work is deducted.	Fronts faced with the best picked marl-stocks, instead of grey-stocks, at per foot super, 6 inches thick, (the common brick-work, if taken, being first deducted therefrom,) in Flemish bond, as per preceding calculation	1	4½
	Do. faced with second marls, do., common brick-work deducted.......	0	8¼

The following are the Average Prices of the Materials alluded to in the preceding and subsequent Prices.

		£.	s.	d.
Bricks delivered, per thousand.	Best marl stock-bricks, per thousand, delivered..................	6	10	0
	Seconds, do. do..	3	14	0
	Grey-stocks, do.	2	2	0
	Place-bricks, do..	1	12	0
	Marl-paviors, do..	3	0	0
	Red-rubbers, do.	4	17	0
	Do. from the Chalfont Kiln, do..............................	7	0	0
Fire-bricks, &c.	Fire-bricks, do...	7	17	0
	Paving-bricks, do...	3	2	0
	Kiln-burnt bricks, do.......................................	2	18	0
	Welsh fire-bricks, do.......................................	12	0	0
Tiles, &c. delivered, per thousand.	Pan-tiles, per thousand, do.................................	5	15	0
	Plain-tiles, do...	2	15	0
	Ridge-tiles, do...	6	0	0
	12-inch tiles, do...	17	0	0
	10-inch do. do..	13	0	0
	9-inch do. do...	10	10	0
	The best Dutch clinkers, do.................................	3	10	0

Allowances on garden-walls, &c. Thames sand. When any of the before-mentioned common bricks, consisting of grey-stocks, &c. are converted into garden and boundary walls to prisons, &c., add 1*d.* per foot superficial for extra facings, but on *one side only*. And if the best Thames sand is required in party-walls, &c., add from 10*s.* to 12*s.* per rod to the respective prices, more or less, according to cartage; and, if sea-sand, in proportion.

Circular walling; quick and flat curves. Brick walls, which are circular on the plan, are worth rather more than those which are straight; from 10*s.* to 15*s.* per rod may, therefore, be added to the foregoing prices for circular works, but which additions should be proportioned to the quickness or flatness of the curvatures, sharp curves requiring greater attention and more labour, consequently better prices.

Detailed value of a rod of brick-work, laid dry in cess-pools, &c.

		£.	s.	d.
Estimate of a rod of dry brick-work, in cess-pools, &c.	5000 place-bricks, at 32*s.* per thousand, delivered................	8	0	0
	3 days, a bricklayer, at 5*s.* per day..........................	0	15	0
	3 days, a labourer, at 3*s.* do.	0	9	0
		£.9	4	0
	Twenty per cent. profit..........	1	16	9½
		£.11	0	9½

It is usual to measure the common sorts of ovens and coppers as solid works, sometimes to deduct the ash-holes; and the custom cannot be considered inconsistent, taking into consideration the extra labour about such works; the dimensions should be taken as cubic, and the product multiplied by 8, and divided by 9, to bring them into reduced brick-work; but ovens and boilers of large dimensions should be valued by detailed measurements. Mode of measuring ovens, boilers, &c.

Detailed value of a rod of brick-work, executed in good Roman cement mortar; that is, one half clean sharp sand, the other half pure cement.

Estimate of a rod of brick-work in Roman cement.

	£.	s.	d.
4500 picked sound grey stock-bricks, at £2. 5s. per thousand....	10	2	6
68 bushels of cement, at 3s. 6d....	11	18	0
68 bushels of clean drift-sand at 4d.	1	2	8
$6\frac{1}{2}$ days, a bricklayer, at 5s....	1	12	6
$6\frac{1}{2}$ days, a labourer, at 3s....	0	19	6
Use of scaffolding....	0	4	0
	£.25	19	2
Fifteen per cent. profit....	3	17	10
	£.29	17	0

Good sound bricks, set in cement, including profit, is worth 1s. $11\frac{1}{4}$d. per foot cube. At per foot cube.

Detailed value of a rod of brick-work in garden-walls and prison boundary-walls, finished with neat flat joints on both sides, one side battering.

Estimate of a brick-work in garden and prison walls.

	£.	s.	d.
4500 picked sound grey stock-bricks, at 45s. per thousand....	10	2	6
150 pecks of lime, at 14s. per hundred....	1	1	0
300 pecks of sand, or 3 loads, at 5s.	0	15	0
6 days, a bricklayer, at 5s....	1	10	0
6 days, a labourer, at 3s....	0	18	0
272 superficial feet for extra facings, at 1d....	1	2	8
Use of scaffolding....	0	4	0
	£.15	13	2
Twenty per cent. profit....	3	2	$7\frac{1}{2}$
	£.18	15	$9\frac{1}{2}$

Taking down old brick-work should be charged as day-work; as likewise the cleaning of the bricks, and the removal of rubbish. And with regard to the old bricks, if they are sound and good, they should be given credit for, according to their qualities; and if worked up again, the work per rod should be charged in the same ratio that the bricks have been given credit for, with fair profits thereon. Observations on taking down old work.

If the entire of the walls are measured as common brick-work, the subsequent charges may be made for extra facings, but always with reference to the value of the bricks and neatness of work.

Extra facings, but with reference to the preceding calculations.

	s.	d.
Extra facings, with best picked marls, per foot super	0	9
Do. with best picked seconds, do.	0	6
Do. with best picked grey-stocks	0	2
Do. do. to circular work, do. extra	0	2½
Do. do. to sharp curves, do. do.	0	3

On Gauged Arches.

On gauged arches, &c.

Rubbed or gauged arches are either set in putty, or very fine mortar, and are generally measured by the foot superficial, and valued according to the worth of the materials and neatness of workmanship, as likewise cornices, niches, &c.

Prices of gauged arches, cornices, &c.

	s.	d.
Semi-circular and cambered arches, formed with the best marl-bricks, and set in putty, per foot super	3	0
Elliptical do.	3	4
Cornices, set in putty	3	6
Semi-circular bodies to niches	4	0
Do. to the crowns thereof	8	0

Customs in measuring, &c.

Arches taken out and repaired with new bricks should be charged in day-work. It is customary to include all manner of rubbed and gauged works in the admeasurements of the common work, and subsequently to measure the rubbed and gauged works, which, with reference to the extra trouble in cutting and closing up to the arches, &c. is a very rational custom, and ought to be, on all occasions, complied with.

Value of party-walls, as adverted to in the Building-Act, 14th of Geo. III.

In the Act of Parliament, passed in the 14th Geo. III., for the regulation of buildings within the Bills of Mortality, it was enacted, that when it should become necessary to erect party-walls, &c. that the expenses thereof should be paid in equal portions by the persons mutually interested, at and after the rate of £7. 15*s.* per rod, making certain allowances for old bricks, &c. At the time the Act passed, the average prices of brick-work were £7. 15*s.* per rod; but since that period the value of labour and materials have doubled, and, in consequence thereof, it is now customary for *two* surveyors, *one* chosen by each party, to determine the value, whose arbitraments *(if they agree)* are final and conclusive.—*Vide the Building-Act, an Appendix to this Work.*

The value settled by two surveyors.

On Drains.

On the valuation of drains and sewers.

The value of drains and sewers should be ascertained by their solid contents, and reduced to the standard thickness; but if charged by the foot running measure, the exact quantities of the materials should be ascertained in each running foot: under these circumstances, we are of opinion, the method first recommended is the best. Small drains, however, may be safely charged by the foot running, as the quantities can be easily ascertained.

	s.	d.	
9-inch gun-barrelled drains in half a brick, per foot run	1	6	Gun drains.
12-in. do.	2	0	
15-in. do	2	6	
15-in. gun-barrelled drains, in one brick, per foot run	5	3	Larger do.
18-in. do	5	10	
24-in. do	9	7	
30-in. do	11	4	
36-in. do	13	1	
Small drains, with pan-tile bottoms, 2-course high, half-brick thick, and covered with bricks, at per foot run	1	0	Small drains.
Do. 9-in. wide, 3-course, in half-brick, paved, and arched over	1	6	
Do. 12-in. wide	1	9	

The digging to drains and sewers should be charged at per yard cube, comprising 27 cubic feet; and the moveable centerings should also be charged as extras. *Digging for drains.*

To find the contents of gun-barrel drains per foot run, add the exterior and interior circumferences together, and take half their products as mean proportionals; then multiply each of those products by *one* foot, and likewise the thicknesses of the drains, and you will obtain the cubical contents of one foot run of each drain; which, multiplied by the cubical value of one foot of brick-work, will yield the true value per foot running measure, or reduce the entire into rods. *To find the value of gun drains.*

	s.	d.	
Sound stock-bricks, built edgeways, quarters included	2	0	Brick-nogging per yard.
Do. built flat, do.	3	7	
Common place-bricks, built edgeways, do.	1	7	
Do. built flat, do.	2	10	
Dutch bricks, or clinkers, laid on edge, per yard	15	4	Brick paving, flat and edge, per yard
Do. laid diagonally	16	4	
Marl paviors, laid flat in sand	3	4	
Do. on edge in do.	5	10	
Do. laid flat in mortar	3	8	
Paving-bricks, laid flat in sand	3	5	
Do. on edge in do.	7	4	
Do. flat in mortar	3	9	
Do. on edge in do.	7	9	
Common hard stock paving, laid flat in sand, per yard	2	6	Common paving, per yard.
Do. on edge in do.	4	3	
Do. flat in mortar	2	10	
Do. on edge in do.	4	8	
12-inch tiles, per foot super	0	8	12-inch Tiles.
10-in. do. do.	0	7	

Observe.—The above prices have been ascertained by references to the preceding prime costs, including profit, with labour and mortar; also to the calculations specifying the given quantities requisite to perform given superficies: the prices, therefore, will be found to vary accordingly.

On Pointing.

On the qualities of pointing.

Pointing is performed by filling-up the joints between the bricks on the external surfaces of walls after they are built. The cements used for the purpose are of various descriptions; and if properly applied, and the work is executed with masterly neatness, it not only protects the walls, by preventing the wet insinuating into the cores, but likewise produces the most pleasing effect. The most useful sort of pointing is that which is called *flat joint*, if the mortar is prepared with Roman cement, and carefully executed, to present neat horizontal and vertical *flat joints*; the latter will convey the water to the external surfaces, and by these means produce the beneficial effects intended. Tuck-pointing is also much in fashion, and, immediately after it is finished, it produces an agreeable effect: it is performed with fine mortar, which is inserted in the joints, with regular projections, neatly pared in parallel breadths; the latter description of pointing has not any thing to recommend it except its neatness: it is calculated to injure the walls, by a cause which must be obvious to the curious and attentive observer.

Flat joint. Roman cement mortar. Tuck-pointing, pleasing effect, nothing to recommend it; calculated to injure walls.

Pointing, per foot super; all openings deducted.

	s.	d.
Flat-joint pointing with prepared Roman cement mortar	0	5
Do. in coal-ash mortar to fronts, &c.	0	3½
Do. in garden and fence walls	0	2
Tuck-pointing to new fronts	0	5
Do. to old fronts, with cleaning and colouring	0	7½

On Plain-tiling.

Observations upon measuring plain tiling, &c.; how to measure.

As this sort of covering is very common, it is deemed necessary to make a few observations thereon. In plain-tiling coverings, as the lengths of the rafters are generally equal to three-quarters of the breadths of the buildings, the surfaces of the roofs will be, or should be, equal to the superficial contents of the spaces the buildings occupy, *and one-half more*; and this being remembered, it will sometimes save trouble, that is, in the operations of measuring. In these sorts of works, allowances also should be made for the double courses to the dripping-eaves, of at least six inches, and four inches for those which are not. All manner of openings should be deducted, and suitable allowances made for hips and valleys; for wherever workmen are hindered from proceeding uniformly in their labour, so as to require greater portions of time to perform the same descriptions of works, the persons so employed ought in justice to be paid in proportion thereto.

Double courses, Dripping-eaves, Hips and valleys, uniformly in labour, same description of work.

Estimate of a Square of Plain-tiling, reckoning the prime Cost of Materials at the preceding Rates.

Plain-tiling, per square.

	£.	s.	d.
600 plain-tiles, at 6*s.* 10½*d.* per hundred	2	1	3
1 bundle of the best laths	0	5	7
Nails and pins	0	1	6
5 hods of mortar	0	2	6
Labour	0	8	0
	£2	18	10

The above prices include the profit which is included in the materials.

	£.	s.	d.	
New plain tiling, as per calculation, but with heart-of-oak laths......	2	18	10	Plain tiling.

Old plain tiling, ripped and relaid upon new laths, finding new tiles where required, from 20*s.* to 25*s.* and 30*s.* per square; the price will entirely depend upon the state of the old tiling, &c. — *Ripping roofs, and repairing with plain tiles, &c.*

The cuttings to hips, ridges, and valleys, in plain tiling, should be charged at 4*d.* or 5*d.* per foot run, or allowances made in the admeasurements. — *Cuttings to ridges and valleys, &c.*

Similar allowances should also be made, where there is any extra time consumed, not accounted for in the prices per square. — *Extra time not accounted for.*

If the ridge-tiles are secured with painted T *nails, they should be charged at 3d. each,* and *hip-hooks at* 15*d. each.*

The price of plain tiling will always depend upon the facilities with which the tiles can be procured, and the consequent extra charges. — *Value of tiling, how to be determined.*

On Pan-tiling.

This description of covering is much cheaper than any other bout the metropolis; the roofs, where they are introduced, not requiring elev... more than *one-third* of their spans. The greatest objection to pan-tiles is their colour; but, if painted with Wilkinson's *blue* Anti-corosian paint, it will produce upon them the most pleasing and agreeable effect; nor will plain tiles be much inferior to slates in appearance, when treated in the same manner. The paint adverted to is sold at No. 63, Upper Thames Street, London, and sent to all parts of the *United Kingdom,* in small casks of 100 pounds each, at 54*s.* per cask. — *Observations on pan-tiling, and Wilkinson's anti-corosian paint.*

Estimate of a Square of Pan-tiling.

	£.	s.	d.	
180 Pan-tiles, at 14*s.* $4\frac{1}{2}$*d.* per hundred	1	5	$10\frac{1}{2}$	Pan-tiling, per square.
1 bundle of laths..	0	6	0	
120 nails..	0	0	6	
Labour	0	4	0	
	£1	16	$4\frac{1}{2}$	

The above price includes the profit, which is incorporated in the prime cost of the materials, as also the mortar for hips and ridges, &c.

	£.	s.	d.	
New pan-tiling, laid dry, including hips, ridges, and mortar to do. ..	1	16	$4\frac{1}{2}$	Average prices of pan-tiling.
New pan-tiling, bedded and pointed outside, with lime and hair....	2	4	0	
Do. bedded and pointed, inside and outside......................	2	7	0	
Pan-tiling ripped, new lathed, and tiled with old tiles, and laid dry..	0	14	0	Old and new.
Do. bedded and pointed in lime and hair, and pointed outside......	1	0	0	Bedded.
Pointing pan-tiling inside......................................	0	7	0	Pointing.
Do. outside only	0	6	0	

Glazed blue pan-tiling laid dry, including hips and ridges in mortar, from 50*s.* to 55*s.* per square. — *Glazed tiles.*

Hip-hooks, 15*d.* each; T nails, 3*d.* each. — *Hip-hooks, &c.*

Cuttings to Brick-work, &c.

	s.	d.	
Cut splays in brick-work, at per foot run............................	0	4	Cuttings of brick-work, per foot run.
Do. bird's-mouths, do..	0	$4\frac{1}{2}$	

		s.	d.
Cuttings to rakes, per foot run.	Cuttings to 18-inch rakes, at per foot run	0	4½
	Do. to 14-in. do. do.	0	3½
	Do. to 9-in. do. do.	0	2½
To ramps.	Cuttings to 18-in. ramps, do.	0	10
	Do. to 14-in. do. do.	0	8
	Do. to 9-in. do. do.	0	6
	Cuttings to points of groined arches, rubbed, per foot run	0	8
Tile-coping.	Foot-tile coping, do.	0	10
	Ten-inch tile do. do.	0	8
Tile-creasing.	Brick on edge, and double plain tile creasing, do.	1	1
	Do. in Roman cement, do.	1	8
	Double plain-tile creasing, do. in common mortar	0	6
	¼-brick sailing courses, do.	0	2
	Do. two courses, do.	0	3
	Do. three courses, do.	0	4
Chimney-pots.	First sized chimney-pots fixed, each	7	6
	Second do. do.	6	6
	Third do. do.	5	6
Door and sash-frames.	Door and sash-frames bedded and pointed in mortar, each	1	6
	Large sized do.	2	0
	Trimmers to chimnies in half a brick, per foot super	0	7
Cuttings and groins, &c.	In measuring brick-work, the cuttings of every description should be collected, and classed in the charges, according to their difficulties of workmanship.		
	Red returns, one course a stretcher, the other a header, &c., per foot run	0	8

Observe, that in measuring *groined* brick-work, the proper method to take the dimensions is, first to include all the apertures, and subsequently to deduct the same, and to add all the cuttings to the points of the arches.

AVERAGE PRICES

OF

MASTER-BRICKLAYERS

FOR

DAY-WORK IN LONDON.

		£.	s.	d.
Bricklayers and labourers wages in London.	Bricklayer, from the 9th November to the 25th March ensuing, per day	0	5	8
	Labourer, do., per day	0	3	4
	Bricklayer, from the 25th March to the 9th November ensuing, per day	0	6	0
	Labourer, do., per day	0	3	6
	Bricklayer, employed in oven-work, &c., per day	0	8	6
Retail price for bricks.	Common place-bricks, per hundred	0	4	0
	Gray-stocks, do.	0	5	2

	£.	s.	d.	
Best marls, per hundred	0	16	3	Retail price for bricks.
Seconds, do	0	9	1	
Marl paviors, do	0	7	6	
Red-rubbers, do.	0	12	0	Red-bricks, &c.
Do. from the Chalfont-Kiln, do	0	17	6	
Fire-bricks, do	0	18	9	
Paving-bricks, do.	0	7	8	
Kiln-burnt bricks, do	0	7	2½	
Welsh fire-bricks, do	1	10	0	
Pan-tiles, per hundred	0	14	4½	Tiles, ridge-tiles, &c.
Plain-tiles, do	0	6	10½	
Ridge-tiles, do	0	15	0	
12-inch tiles, do	2	2	6	
10-inch do. do	1	12	6	
9-inch do. do	1	6	3	
Dutch clinkers, do	0	8	10	Clinkers.
Best Chalfont oven-tiles, 12-inches square, 3-inches thick, do	6	11	3	
Welsh fire-lumps, 16-inches long, each	0	3	9	Welsh fire-lumps.
Do. 18-in. do	0	4	4	
Do. 20-in. do	0	5	0	
Do. 22-in. do	0	6	3	
Do. 24-in. do	0	7	6	
Do. 28-in. do	0	8	9	
Do. 30-in. do.	0	10	0	
Do. 33-in. do	0	11	3	
Do. 36-in. do	0	12	6	
Lime, per hundred	0	15	7	Lime, cement, &c.
Do. by the bushel	0	0	8	
Flame-burnt do., per hundred	1	0	0	
Dorking lime, do.	1	8	9	
Dutch Terras, per bushel	0	6	3	
Roman cement, do	0	4	6	
Single loads of sand, or yard cube	0	6	3	Sand.
Double do. do	0	12	6	
Windsor loam, per bushel	0	2	4	
Pan-tile laths, 12 feet long, per bundle	0	6	0	Laths.
Do. 10-feet do	0	5	7	
Oak laths, per bundle	0	6	7	
Best double-fir laths, for tiling, do	0	5	7	
Do. per load, for 30 bundles	8	2	6	
First size chimney-pots, each	0	5	0	Chimney-pots.
Second do. do	0	3	9	
Third do. do	0	3	2	
Fourth do. do	0	2	6	
Bracket pots, do	0	10	0	
Hovel armed do	0	8	5	
Plain hovel do	0	6	3	

		£.	s.	d.
Chimney-pots.	Plain arm pots, each	0	5	7
	Do. caps, each	0	3	6
	Large size pots, with cowls, or tin veer-abouts	1	2	0
Retail prices for mortar, &c.	Load of mortar	0	17	6
	Hod of mortar	0	0	6
	Lime and hair, per load	1	6	0
	Hod of do.	0	0	9
	Hod of fine-stuff	0	1	6
	Hod of white pointing mortar	0	2	3
	Hod of blue mortar	0	2	0
	T nails for hips and ridges	0	0	2
	Hip-hooks and nails, each	0	1	4
End of the day-prices.	Carting away single loads of rubbish	0	3	6
	Double do.	0	7	0
	Tile-heads, per basket	0	0	10
	Ozier baskets	0	1	8

On Diggers' Work.

Average wages of labourers in the United Kingdom.

The price of digging is ascertained by the yard cube, containing 27 cubic feet, the value of which will, in a great measure, depend upon the local wages of labourers. In some parts of the kingdom, they are not paid more than 10*d.* per day; in London, the average may be taken at 3*s.*, and in most country places at 18*d.*; the general average may therefore be taken at 1*s.* 9*d.* or 2*s.*, and with reference to such wages, the subsequent prices have been considered; but the intrinsic value of digging, in all cases, will depend upon the nature of the soil, or earth, to be dug out and removed. If the earth be light and loamy, the price should be moderate; if a stiff clay, in proportion to the *extra* labour; and, if the earth or rubbish to be dug out and carried away, consists of burrs of brick-work in old foundations, intersected with drains, sewers, cess-pools, and bog-holes, the prices for digging, removing, and carting away, should be regulated accordingly; in fact, it is hardly possible to say what digging is worth under such circumstances: at any rate, 3*s.* 6*d.* per yard will not be too much, and, perhaps, 4*s.* would be nearer the mark.

General average 1*s.* 9*d.* per day.

Intrinsic value of digging.

Foundations of rubbish.

		s.	d.
Prices of digging in London.	Digging and throwing out in foundations, per yard	0	7
	If gravel or clay, do.	0	9
General prices of digging, &c.	Digging and levelling round foundations, do.	1	1
	Digging and wheeling to the distance of 25 yards, do.	1	6
	If to a greater distance, in proportion.		
Carting, &c. 1000 yards distance.	Carting per yard, to the distance of 500 yards, do.	3	0
	Do. if to the distance of 1000 yards, or thereabouts	4	0

Well-digging, per foot running.

The price of well-digging also depends upon the qualities of the soil, nor is it possible to say, in many situations, what the worth will be at per foot, running measure; the exact prime costs, in these cases, should be kept to the end, that equitable prices may be apportioned.

	s.	d.	
Wells about 10 feet deep, and 4 feet in the clear, digging and steining the same, exclusive of materials, at per foot run	3	3	Prices of well-digging.
Do. with all materials to the depths of 20, 25, and 30 feet, do.	4	9	Do. according to the depths.
From 30 to 50 feet, do.	6	0	

And for every 20 feet extra in depths may be added, 1*s.* 3*d.* per foot run to the last price, and afterwards proportionately.

27 cubic feet of earth is a single load.

54 do. is a double load.

A cubic yard of gravel, containing 18 bushels in the pit, when dug, will increase in bulk nearly one-half, and produces about 27 bushels. Gravel.

18 Cubic feet is estimated to be one ton of soil, and 45 cubic feet $2\frac{1}{2}$ tons; and the soil-carts, employed to convey the same away, will hold the latter quantity; sizes 6 feet long, 3 feet 6 inches wide, and 2 feet 6 inches deep. Soil. Carting away, &c.

The subsequent are the average Prices of Digging in Dublin.

Digging and throwing out, per cubic yard, from 4*d* to 6*d.* and 8*d.* Prices of digging in Dublin.

Digging and wheeling away about 20 or 30 yards, from 1*s.* to 1*s.* 2*d.* and 1*s.* 4*d.* per yard.

Wells dug, at per foot run, 3 feet 9 inches diameter :—

	s.	d.	
First 20 feet, per foot	3	3	Wells.
Do. next 10 feet, do.	4	4	
Do. next 10 feet, do.	5	5	

And for every extra 10 feet, in proportion.

In rock-work, from 20*s.* to 40*s.* for every foot run in depth, finding gun-powder; and all the materials laid down contiguous to the mouth of the well. Rock-work, gunpowder, &c.

Observe,—For the last mentioned price, the well-digger provides all his own implements.

The following are the prices, where the employer finds all the implements :

	s.	d.	
For the first 10 feet, per foot run	2	2	Employer finding all materials.
For the second do. per do.	2	$8\frac{1}{2}$	

And to increase $6\frac{1}{2}$*d.* per foot for every 10 feet deeper; and for every cubic foot of rock-work after the same ratio, in reference to the before mentioned prices of 20*s.* and 40*s.* Increase of prices.

Duties on Bricks.

As the prices of bricks are, in certain degrees, regulated by the duties imposed, from time to time, by Parliament, it will be requisite, on all occasions, to be aware of what those duties are. During the periods of moulding, excise-officers are bound to take exact accounts of the quantities prepared for burning, in order that master-brick and tile-makers may be charged after the following rates: that is, Parliamentary duties on bricks. Moulding of bricks. Burning of bricks and tiles.

	£.	s.	d.	
For every *thousand* bricks, not being more than 10 inches long, 5 inches wide, and 3 inches thick, the sum of	0	5	10	The duties on bricks and tiles.
If they exceed the above sizes	0	10	0	
And, if smoothed on one side, and not more than 10 inches long, and 5 inches wide	0	12	0	

		£.	s.	d.
	If exceeding the aforesaid sizes	1	4	2
Pan and plain tiles.	Ridge and pan-tiles, per thousand	0	12	10
	Plain tiles, do.	0	5	8
	Paving tiles, not more than 10 inches square, do.	1	4	2
	Do. more than 10 inches, do.	2	8	4
	And do. for tiles of every description not in the above list, do.	1	8	4

On River and Sea Sand, &c.

River and rivulet sand.

River sand connected with the sea is of the latter sort, washed up by the tides.

Sand, an article of commerce.

Pit and land for plasterers.

Quick River Sand is of that species which is collected in rivers where the streams are very rapid, as in the rivers *Trent* and *Severn*, in England; and the *Shannon*, &c. in Ireland: it is also to be found in rivulets connected with land-drains and sewers contiguous to public roads, from whence the *granule* (small grain, or grains of accumulated sand) is conveyed and deposited after showers of rain, which, being cleansed by the quickness or rapidity of the running stream, subsequently becomes an article of commerce, great interest, and value to the mason, bricklayer, and plasterer, as well as in assisting to make various sorts of cement, fit for the purpose of building strong walls, and finishing all manner of plasterers' work, where pit, land, or other sand, is not deemed absolutely necessary; but which is the case in the interior of our habitations, where the finer sort is indispensably requisite, for mortar to be used about ornamental plastering, in order to produce those smooth and pleasing effects so desirable, where comfort and good taste prevail.

Without good sand, plasterers cannot make good mortar.

For the inside-works of our houses, &c., the major part of the plaster, or mortar, requires to be made and compounded, as above observed, with choice fine pit or other sand, of suitable qualities, free from slime, mud, or other imperfections; and upon this subject we need not say more than recommend to plasterers to obtain the best sort of sand from those pits, or rivulets, which are held in the highest reputation.

The river Thames sand; its qualities, and approval by architects, &c.

The river Thames sand, from above bridge, about Fulham and Putney, has been for many years considered by our London architects, surveyors, and builders, as the best about the metropolis; and we admit the sand so taken thereabout to be of an excellent quality; but, from its being intermixed with cockle-shells, mud, rubbish, &c., it requires much filtering, and considerable labour, before it is fit and proper to be incorporated with slaked lime, intended for good binding mortar.

Fine clean sand; how procured; manner it is made.

Drains to the stream.

The best, and perhaps the most desirable, sand which can be required for very *choice* purposes, is that species which may, at intervals, be procured in narrow, quick running mill-streams, or others of the same description, which are frequently contiguous to mountains, or to great public roads, where the gravel in the gross has been pulverized by carriage-wheels, and which has undergone further pulverization by being subsequently ground to the *standard* size of grains of sand fit for building purposes; which, being afterwards conveyed by open drains to the running-stream, presently becomes purified from all manner of filth, and thereby rendered immediately fit for use.

The sand accumulated in large rivers, such as the Thames, and many others that could be mentioned, consists of such river-sand as before described, as well as of large portions of sea-sand, which, being washed backward and forward by the influx and reflux of the tides, consists of two sorts; that is, of quick river-sand and sea-sand, which, being incorporated, renders the particles, *in mass*, a complete body of two species of sand; one sort created by the revolving of the flint-stones at the bottom of the sea, and the other sort the pulverized flint and gravel stones made into sand, on our public highways, by carriage-wheels running over them, and which, being subsequently washed into rivers by showers of rain, ultimately come in contact with the sea-sand; so that, in fact, the sand taken out of our great rivers connected with the sea, consists of two sorts; but the sand procured on the coast is pure sea sand, washed on the shore by that great and powerful element, on the banks of which it can, at all times, be procured for building purposes; and, when exposed to the atmosphere, washed by the rain-water, and purified by the exhalations of the sun's heat, the surface of it is cleansed from all manner of *saline* particles, and the entire body, within a very short period, rendered fit for use.

River and sea sand; how it comes in contact.

Sea sand, how produced.

Sand made on turnpike-roads.

Sand out of great rivers.

Sea sand properly treated, fit for immediate use.

Road Stuff, about the metropolis, is also used in large quantities for making common building-mortar, and, from the want of a better substitute, it has, in some degree, received the concurring sanction and approbation of professional builders; but, for ourselves, we do not approve of this material, which is compounded not only of mud, but of all manner of filth, which certainly cannot benefit or improve the mortar with which it is mixed, but must, on the contrary, help to impoverish it: for speculators it may answer the purpose, as being the cheapest substitute for river or sea sand. The stuff here alluded to is used, not only about the metropolis, but also in other great towns, without regard to quality; and for it, we believe, the Commissioners of the Turnpike-roads charge a high price, per load, being little short of the full value of the best quick river sand, or of the purest bleached sea sand; the latter of which may be procured, in large quantities, at short notices, from any of the great sea-port towns in England, Ireland, and Scotland. From what has been stated upon this part of our subject, it would seem that our flint-gravel is bought by the public in bulk, to mend our roads; and, subsequently, retailed in small quantities, in a state of pulverization, after it is raked together by the parish-labourers, or the servants of public road-makers, to make mortar.

Turnpike-road stuff.

Builder's approval.

Mud and all manner of filth.

Commissioners of turnpikes.

Sea sand, at short notice.

Gravel

Parish-labourers.

We applaud the economy and commercial conduct of the Commissioners above mentioned, but cannot allow that the heterogeneous matter retailed by them to our builders, for making mortar, is the matter best adapted to such a purpose. We are aware of public prejudice; but, in this age of improvement, sincerely hope, for the honour of the Building profession, that, 'ere long, no other than the best material that can be used for incorporating slaked lime, and for making mortar, will be introduced into the metropolis by the entire body of our respectable and intelligent builders: this will, at once, supersede and remove the necessity of their being reduced to purchase a very inferior and improper substitute for sand, at present too frequently introduced by them into building-mortar, which is calculated not only to depreciate property, but to bring buildings, when erected, into disrepute.

Good sea-sand to be introduced, to supersede the use of road-stuff.

Suggestions to builders.

Much more might be advanced on this subject, but being convinced that sufficient has been suggested to the speculative mind, as to the measures which should be adopted, in order to produce a *mart* for building-sand, we shall leave the rest to be accomplished by those, whose interest and whose business it is to carry such a plan into execution.

Erroneous opinions of professional men on sea-sand.

An erroneous opinion, we are thoroughly convinced, has hitherto prevailed with professional men respecting sea-sand, the quality of which is not generally known to our brethren in the metropolis: in these enlightened days, therefore, let us hope that mistaken notions and prejudices may be removed; that we may henceforth listen to the voice of reason and truth; and at once, according to the practice of some other places, adopt the use of sea-sand in all our buildings, whether public or private, being first satisfied of the propriety of so doing. In order to be consistent, let us investigate the subject, as other men have done before us, that we may ascertain the truth. It is difficult to contend against public prejudice in a great city, or in any place; but where the principle and doctrine of truth can be maintained, she will always bear the sway and ultimately triumph over the despotic influence of prejudice, to suit whose baleful principles, sinister purposes are frequently adhered to, against the consciences of men, who are sometimes weak enough to flatter themselves they can eclipse, by throwing the veil over the bright and shining influence of truth; the brilliant effect of which cannot be subdued by the artful sophistications of subtle and ingenious men, who, in the course of their professions, are frequently employed for the express purpose of perverting the truth, and corrupting the natural course of justice.

Public prejudice difficult to overcome.

On the crystallized bodies to be found in sand.

Collected bodies of pure building-sand, of each description mentioned, consists of innumerable particles of impenetrable and crystallized bodies, which being collected and put together in masses, may very truly be said to consist of myriads of component fractional parts of larger bodies, chipped off, separated, or formed, out of pulverized materials, in the manner before described; each *granule*, or small grain, being, as we know, an irregular prismatic solid, of course not any two parts of such collected materials can be, as we apprehend, known to correspond; consequently, when such materials are incorporated with slaked lime or cement, they will naturally contribute to dovetail and unite the cement in concreted masses, forming entire bodies. Sand, therefore, which is compounded of broken gravel, flints, or flint-glass, will possess the most knitting and binding qualities, and especially if mixed up soon after the particles have been fractured, and further reduced to the sized grains of sand required for building; for as their sharp edges will then be acute, their adhesive properties will then be more susceptible of adhesion; which, being the case, should be immediately introduced into the slaked lime, if ready, for the incorporation of the proportioned admixtures of sand, on the most perfect quality of which will depend, in a great measure, the quality of the cement.

Sand should be incorporated when most alive.

Is sea-sand impregnated with salt-water?

Having now, as we conceive, discharged our duty, by explaining the different qualities or particles of sand, let us ascertain, if possible, by the co-operative power of theory and practice, if sea-sand is, or can be, impregnated with sea or salt-water. It has been proved, over and over again, that sea-sand is a crystalized body, possessing precisely the same quality of material as our common

flint bottles, which are used for wine, &c. The truth and fact is, that sea-sand consists of nothing else but particles or grains of flint-stones, the chippings of large ones, known to be at the bottom of the sea, which, from the perpetual motion, action, and re-action, of that powerful element, occasion an infinity of particles of such chippings to be continually floating in the water, which, in the course of time, and by degrees, are lodged on the banks of the sea-shore, where it accumulates, and may be obtained, in prodigious quantities.

Sea-sand same quality as flint-bottles.

Sea-sand, chippings of flints.

To ascertain, by experiment, whether sea-sand be impregnated with salt, the first step to be taken is, to procure a small quantity which has been collected from the sea-side, bleached, and subsequently exposed to the rain, and perfectly dried in the sun; and in this state it should be put into a saucepan, containing fresh water, and boiled, and if the water should turn out to be brackish, it will be proof that the sand is impregnated with salt; but as the experiment has been repeatedly tried by men of experience, we feel authorised to state, by the information received, that the prejudice entertained by many persons against sea-sand is altogether unfounded. In order to satisfy those who may be anxious to ascertain the truth, we beg leave to refer them to Mr. Peto, of Little-Britain, whose extensive experience, as regards sea-sand, has been derived from building the great hospital, at North Yarmouth, for government, under Mr. Pilkington, the architect, at which place no other than sea-sand was used in compounding the mortar. But, if it were necessary, we could prove, by innumerable witnesses, where sea-sand has been used, for time immemorial, with effect, and where the mortar is of the most unexceptionable quality: but, for the present, as an uncontrovertible document, and verification of what has been stated, we beg to submit, for the information of our friends, the subsequent certificate of builders, of the very highest respectability in the town of Brighton, who, together with Mr. Peto, and Mr. George Smith, an eminent surveyor, have ratified the same, by a similar opinion, in the most solemn manner.

How to prove the virtue of sea-sand.

Prejudice against it unfounded.

The opinion of Mr. Peto, an experienced builder, in favour of it.

Sea-sand has been used for centuries.

Mr. G. Smith, surveyor of the Mercer's Company.

"Brighton, Jan. 22, 1825.

We, whose names are undersigned, do give it as our opinion, from many years experience, that a wall built with sea-sand, is much stronger than one built with land-sand.

Certificate from surveyors at Brighton.

Richard Patching, Sen., Bricklayer, above 50 Years.
Richard Patching, Jun., Do., above 35 Years.
Robert Ackerson, Town-Surveyor and Bricklayer, above 50 Years.
Cornelius Shrivell, Sen., Bricklayer, above 36 Years.
Thomas Harman, Sen., Town-Surveyor and Bricklayer, above 50 Years.
William Russell, Surveyor and Builder, above 40 Years.

Builders and surveyors.

We have, likewise, the opinion of Mr. Leggat, an eminent surveyor and builder, at Brighton, on this subject, who, in confirmation of sea-sand being preferable to pit or any other, hath declared, under the most solemn obligation, that during the forty-eight years he had been in business, at Brighton, he had always used and recommended sea-sand for making mortar, in preference to any other; that the house he lived in was built with mortar, consisting of lime, coal-ashes, and sea-sand; that he had built many in the town in like manner, and

The opinion of Mr. Leggat, of Brighton.

Continuation of Mr. Leggat's opinion.

that he never felt any inconvenience from damp, or the appearance of it; but that his opinion had always been, that walls built with mortar, composed of coal-ashes, lime, and sea-sand, did not dry quite so fast as those built with land-sand and lime, but that the former dried *harder* and *better;* and that when it became necessary to pull down walls built with lime, coal-ashes, sea-sand, and bricks or stone, it required double the labour to what it did to pull down walls built with mortar, made of lime, with land or any other sand. And, furthermore, that if he was required to build a prison similar to Newgate, where strength and durability were required, that he would use sea-sand in the mortar in preference to any; and in this opinion Mr. Peto, before-named, has also concurred, who likewise declared, at the meeting alluded to, that if he could procure sea-sand as easy as any other, he would use nothing else but lime, sea-sand, and coal-ashes, in making mortar for the numerous works he was then engaged in, or for which he might engage hereafter.

Land-sand.

The opinion of Mr. Peto, an eminent builder.

On the various opinions respecting sea-sand.

As various opinions on this subject have been entertained by Architects, Surveyors, and Professional Builders, &c., we have spared no pains whatever to arrive at the truth, and feel happy to inform our friends, so far as we have hitherto been able to form an estimate of public opinion, that sea-sand will soon and once again be considered, in the metropolis, as the most fit and proper sand, to be incorporated with lime and coal-ashes, for the purpose of making mortar for building walls equal in strength to any that can be found in the public buildings on the coast of England, Ireland, Scotland, or in any part of the world.

The opinions of Mess. Higgins, Laing, and Gill.

We have also obtained the joint opinion of Messrs. Higgins, Laing, and Gill, architects and surveyors, upon the quality of work performed with mortar made with sea-sand, which they have declared to be performed in a workman-like manner, and with good materials; this corresponds with the sentiments and opinion of Mr. Peto, and Mr. George Smith, before-named, as also with Mr. Leggat's, and the gentlemen whose names are subscribed to the before-mentioned certificate; all which we consider excellent proof of the efficacy of sea-sand being, not only good, but an *essential*, article to be incorporated with lime and coal-ashes, to make unexceptionable mortar: and, if it were requisite, we could obtain certificates to the same effect from all the builders on the sea-coast, bearing testimony that sea-sand is better than any other, as part of an *essential* compound to make the best mortar or cement that can be required for building good substantial walls.

Price of sea-sand. Method of preparing it for use.

The price of sea-sand, as retailed on the coast, is 4*s.* per load, which is about the same price as other sand. It is collected in the summer season, and laid out to dry in large open yards, exposed to the weather, whence it is taken, either by the builders, or carriers employed for that purpose, as it is wanted. It has been insinuated, and attempted to be proved, by illiterate and improper persons not worthy of belief, that builders near the sea-shore draw the sand dripping wet from the banks, and mix it in that state with the lime, than which nothing can be more absurd, as it would be impossible to make mortar with sand in that state: the insinuation, therefore, refutes itself, and is its own reward.

On MASONS' or STONE-CUTTERS' WORKS,

IN ENGLAND, IRELAND, AND SCOTLAND.

London and Country Masons.

It has already been noticed, that Masons, or Stone-cutters, as they are most properly called in many parts of the kingdom, are identified in London as Masons only; and, in several parts, they are recognized also as Bricklayers, and are employed in building brick and common stone walls; but Masons, or scientific Stone-cutters, whose art is the subject of our present Section, are, in general, artisans well-informed in their trade; and in those countries where stone most abounds, they are generally the most skilful. Hence it happens that London is supplied with the most intelligent Masons from the Northern parts of Great-Britain, where the article of stone is chiefly used in building.

Northern stone-cutters.

Free-Stone of England, Ireland, and Scotland.

Portlandstone, Yorkshire stone, &c.

In Great Britain and Ireland we have some of the most valuable quarries of Free-stone perhaps in the world, the qualities of which are not generally known to those whose practice has been confined to the metropolis, where Portland-stone has been chiefly used for what is required; that is, where bricks cannot with propriety be substituted. Considerable quantities, also, of Yorkshire stone, consisting of paving, flagging, and landings, of various sizes, are sent to London; together with Moor-stone, and granites for paving, &c.; as likewise the Painswick and Bath-stone, the two latter of which species are used for the same purpose as Portland in our public buildings.

Price of stone regulated by the wages of the country.

The qualities of the description of stone mentioned are well known and justly estimated. It is, however, but candid to state that we have, in many parts of the Kingdom, descriptions of stone far superior to what is at present sent to London. The prices for the former of which are regulated according to the local wages and customs of the provinces and counties where it is raised.

On measuring masons' work in London, including profit and labour.

Masons' or Stone-cutters' works, in London and its environs, are measured in cubic and superficial feet; Portland stone in cube feet, when the thicknesses are above 2 inches or $2\frac{1}{2}$ in. And to find the intrinsic worth, the first step to be taken is to ascertain the cubical contents, as well as the value of the stone, in reference to the prime cost, including the freightage and land-carriage to the place where it is used; to which should be attached the usual profit thereon; and, subsequently, the value of the labour, comprehending the sawing, together with the various gradations of workmanship, including hoisting, &c. the value of which should be arithmetically proportioned according to the degree of difficulty in raising the stone.

Sawing and workmanship.

How to value plain and sunk work, &c.

Having regulated the value of the stone in cube feet, the next step to be taken is to ascertain the several degrees of workmanship, consisting of plain and sunk works, with throatings, &c. Plain work signifies the labour upon the horizontal and vertical faces of the stone, which are smoothed, wrought, or tooled over; and as cut or free-stone work is chiefly sawn, it is customary to allow one portion of the plain work nearly at sawyers' prices; the second at double those rates, being the mean ratio or proportionate value for the labour of plain-work, exclusive of tooling, which should be charged according to the work it represents.

Mean proportion.

Explanation of sunk-work; its use

Sunk-work, upon horizontal stone surfaces, imply such parts as are necessarily and gradually reduced towards the upper and outer edges, in order to throw off the wet; and the throatings imply the narrow groovings near the outer edges on the under sides of window-sills, string-courses, &c., to prevent the water running down the faces of the walls: and, besides the sunk-work described must also be included, those in the planciers of cornices, and all manner of reductions, from the plain faces of stone-work to their ultimate assumed forms.

Allowances for waste.

In ascertaining the cubical contents of the stone before it is wrought, reasonable allowances should be made for waste in the admeasurement, the superficial faces should then be taken for plain and sunk works; to which should be added, *one bed* and *one upright* joint for plain work to every stone, and subsequently, if any, the circular, plain, and sunk works to each stone, with the straight and circular moulded works. In the performance of which operation, it requires particular attention to measure all the plain and sunk works which the masons or stone-cutters are justly entitled to, upon the respective faces, in progressively bringing forward their works. Plain and sunk works are measured in superficial feet, and throatings, and all narrow sinkings, in feet running measure.

Great attention requisite to measure masonry.

To measure stone cornices.

The labour to stone cornices should be measured by girting round the mouldings, that is, round all the vertical and horizontal sides, and this is termed *moulded work;* and if circular, *circular moulded work,* the superior plain surfaces of cornices being weathered to throw off the wet, should also be measured as sunk work; and the plain work to all the joints should likewise be taken in the manner before described. The solid contents of the stone should be first measured, and subsequently the labour thereon.

Weathering.

To measure columns, &c.

To measure stone columns, first proceed as last mentioned, then take two sides of the solid stones, and to each of the columns their beds, for plain work; the heights and circumferences should then be taken as circular sunk-work, with their several plain faces or beds; having finished the shafts of the columns, then proceed to measure the bases and capitals, first taking the solid stones, and, subsequently, the plain, sunk, and moulded works; but, if the capitals should be Ionic, Corinthian, or Composite, then take as nearly as possible the presumed solid contents of the stone, and ascertain the *quantum* of time consumed in carving; which, being added to the worth of the stone, with suitable profits on the workmanship, will constitute the value, in which should be included the labour of fixing, hoisting, &c.

Ionic, Corinthian, and Composite.

Different sorts of works measured in the same manner.

Pilasters, cornices, friezes, architraves, plinths, belting-courses, plain and champhered rustics, balustrades and balusters, steps, staircases, copings, strings, and every description of cut stone-work, should be measured and valued upon the principles already explained, having reference, at all times, to the prime cost, including freightage, land-carriage, waste, labour, extra hoisting, and profit; all these combined circumstances must be taken into consideration in finding the value of masonry in London, or elsewhere, which, like every other description of work, will be found to vary in value, according to the currency of wages and local customs.

To measure staircases.

In ascertaining the value of stone steps, to geometrical and other staircases, judgment is requisite; for, as the steps are bevelled on their soffits, and the winders cut diagonally with apparent loss, it is necessary to comprehend that such steps are

formed without much actual loss, if any, to the mason, who judiciously contrives, in cutting the stone, to form nearly two steps out of one solid piece, whether intended for straight flyers or diagonal winders; the exact cubical contents, therefore, of the steps should be ascertained for the value of the stone, and for the labour, the *plain* and *moulded* work, and, if moulded, the entire heights of the risers and moulded nosings should be taken for the moulded work; the treads for plain work, and the soffits as plain work; the latter being valued as for *sawing* only; curtail-steps should be measured and valued as solids, and the labour thereon ascertained by admeasurements, which should be equivalent to the extra trouble and judgment requisite in forming them.

Plain and moulded works on steps.

Curtail steps, how to value.

The construction of rubble-walls are scarcely known about London; but, in many parts of the kingdom, such edifices are very common.

Common rubble-walls.

In Scotland, where stone is plentiful, the standard thickness is 2 feet, the contents are found in feet and inches, and, subsequently, divided by 9, which reduces the work into superficial yards, and the yards are again divided by 36, which reduces the entire into roods; when the walls are more than 2 feet in thickness, they are reduced to the standard, by adding one-third, one-quarter, or one-half, more or less, according to the respective thicknesses.

Scotch stone-walls. Contents reduced to yards, then to roods; above 2 feet are reduced to the standard.

The customs in that part of Great Britain, in taking the admeasurements, vary according to the places, and the nature of the agreements.

Customs of measuring differ.

In Glasgow, if a builder engages to perform masonry for workmanship only, the dimensions are taken round the buildings, on the outsides, for the lengths, and, multiplied by the heights at the same thicknesses, or by as many heights separately, as there are thicknesses. The external measures produce something more than the actual contents, by the additions of the respective quoins, which, by comparison, may be esteemed as square pillars of stone, 2 feet thick; but these additions, or allowances, are not more than equivalent to compensate for the extra trouble in plumbing the quoins. If the buildings are executed with cut-stone plinths, belting-courses, cornices, blocking-courses, &c., the dimensions for the heights are taken by girting over all the parts mentioned, and for the lengths by girting around the buildings over the pilasters, if any, together with the residue of the cut-stone work.

Principles of measuring in Glasgow, heights and thicknesses.

Not more than equivalent to compensate.

This practice is, perhaps, the most absurd of any that can be adduced, inasmuch as the additional extensions, in heights and lengths, cannot be equivalent compensations for the value of the extra labour upon the cut or dressed stone.

One of the most inconsistent practices.

Average Specific Weights of Stone.

	Ton	cwt.	qr.	lb.
15 cubic feet of Portland stone weighs	1	0	3	20
13 cubic feet of marble weighs	0	19	2	13
20 cubic feet of chalk-stone weighs	1	0	0	1

Specific weights of stone, marble, and chalk.

From 50 to 60 feet super. of Purbeck paving will weigh above one ton; the exact weight will depend on its thickness.

Do. Purbeck.

From 70 to 80 feet super. of Yorkshire paving will weigh above one ton; the exact weight will also depend on the thickness.

Do. Yorkshire.

The weight of stone varies, but the above may be taken as fair average weights.

AVERAGE PRICES
OF
MASONS' OR STONE-CUTTERS' WORKS,
IN ENGLAND, IRELAND, AND SCOTLAND.

		s.	d.
Portland stone	PORTLAND-STONE, including freightage, landing, wharfage, and profit, but exclusive of the land-carriage to the places where it is to be used, per foot cube	5	0
	Do. exceeding the ordinary size of 6 feet	5	6
Plain, sunk, circular, and moulded work on do.	Plain work, per foot super	1	2
	Do. tooled	1	4
	Sunk work	1	6
	Circular plain work	1	6
	Circular sunk work	1	10
	Moulded work	2	0
	Circular moulded work	2	4
Sawing.	Sawing do	0	7
Joggles, &c.	The prices for sunk joggles should be proportioned to their sizes.		
	Groovings, do., per foot run	0	3
	Throatings, do	0	2
Portland window-sills.	Portland window-sills should be measured and charged at per foot cube; and the plain, sunk, and throated work, charged separately: and it would be more satisfactory if the entire of work in Portland stone was charged in the same way.		
Mantles and jambs.	Portland mantles, and jambs to chimnies, with slabs 1-in. thick, per foot super	1	8
	If thicker, add in proportion.		
Paving in courses, &c.	Portland paving, laid in straight courses, and 1½-in. thick	2	0
	Do. laid diagonally	2	4
Prices of work on Portland.	12-in. feather-edge Portland coping, 2½-in. on the front edge, and 1½-in. in the rere, throated and set, per foot run	2	6
	Do. 3-in. do	2	9
	Do. 18-in. wide	3	4
Balconies, &c.	2½-in. Portland balconies	3	3
	3-in. do. do	3	6
	3½-in. do. do	3	9
Sinks, &c.	6-in. Portland sinks, per foot super.	5	0
	7-in. do	6	0
	8-in. do	7	0
	5-holed Portland sink-stones, each	3	6
	Taking down, re-working, and re-setting masonry, should be charged as day-work.		
Balusters.	18-in. Portland balusters, 4½-in. diameter, fixed, each	12	0

	s.	d.	
Chimney cramps, each	0	6	Cramps, &c.
Do. let into Portland	0	9	
Do. run with lead	1	0	
Holdfasts, each	0	3	Holdfasts, &c.
Moderate sized turned Pateras, in Portland, each	2	0	
Plain rounded corners in do.	0	8	
Moulded do.	1	0	
1-inch holes cut in Portland for iron bars	0	2½	Holes.
2-in. do.	0	3½	
4-in. do.	0	5½	
6-in. do. do.	0	9	
Washers let into Portland sink-stones	0	10	Washers, &c.
Holes cut for pipes in do.	0	10	
Extra hoisting may be charged per foot cube above 25 feet in height, after the rate of 4*d.* per foot cube, and for every subsequent 5 feet in arithmetical progression.			
Common Yorkshire paving, at per foot super	1	1	York paving and landings.
Rubbed do.	1	6	
3-inch paving do.	1	4	
3-in. York landings, rubbed do.	2	6	
4-in. do.	3	4	
5-in. do.	4	[illegible]	
6-in. do.	5	0	
12-in. weathered coping, set, per foot run	1	6	Coping.
16-in. do. do.	2	0	
12-inch coping, 2-in. thick, set, do.	1	9	
16-in. do do.	2	3	
12-in. coping, 3-in. thick, do.	2	0	
16-in. do. do.	2	9	
Yorkshire sink-stones, per foot super	5	0	Sink stones.
Do. 5-hole sink-stones, each	2	3	
Holes for iron-work, each	0	[illegible]½	Holes.
Coal-plates let in	2	9	
Throating, per foot run	0	2	Throatings.
Window-sills, 9-in. wide, sunk and throated, per foot run	1	9	
York steps, do.	3	0	
Purbeck paving in random courses, at per foot super	1	2	Paving in Purbeck, &c.
Do. in straight courses	1	4	
Do. rubbed	1	10	
Purbeck steps, per foot run	3	0	
Do. Channel-stone	1	9	
Bath stone, per foot cube	4	0	Bath stone.
Do. extra size above 6 feet	4	4	
Plain work on do. per foot super	0	8	
Sunk do. on do.	0	9	
Moulded do. on do.	0	11	
Ryegate hearth-stones and covings 1-in. thick, at per foot super	1	2	Ryegate stone.

		s.	d.
Ryegate stone.	Ryegate hearth-stones and covings, $1\frac{1}{2}$-in. thick	1	4
	Do. 2-in. thick	1	6
	Do. 4-in. thick, for bottoms of ovens	2	6
Painswick stone.	Painswick stone, at per foot cube	4	9
Plain, sunk, and moulded work.	Plain work on do., per foot super	0	10
	Sunk-work do.	1	0
	Moulded do.	1	2
	1-inch mantles and jambs to chimnies, do.	1	[illegible]
	$1\frac{1}{2}$-in. paving in courses	1	6
	2-in. do.	1	10
	Throating, per foot run	0	$1\frac{1}{2}$
Aberdeen granite.	Scotch or Aberdeen granite, per foot cube	5	9
	Plain work on do., per foot super	3	0
Moor stone.	Moor-stone paving, per foot super	2	0
	Do. kirb-stone, per foot run	2	9

On Statuary and other Marbles.

Statuary Marbles.

Pure or genuine Italian Statuary Marble is without blemish, and it is very highly estimated when it can be procured. To the sculptor it is invaluable, inasmuch as the quality of it adds lustre to the workmanship, and enables the artist to command the highest price for his labour, ingenuity, and taste.

Superior chimney-pieces. Inferior chimney-pieces. Contracts. Price of statuary. Equitable prices.

This species of marble is seldom used about buildings, unless for chimney-pieces of a superior description; and, when required, sculptors generally make their contracts to furnish every part at stipulated sums, which supersedes the necessity of admeasurements. Inferior statuary chimney-pieces, in London,* and at other places, are made for sale at various prices, from 15 up to 20, 30, 40, and 50 sovereigns each. If made agreeable to designs furnished, the prices are previously agreed upon; and if not, should be, to prevent unpleasant disputes, as upon the value of statuaries' works few men can be found to agree in opinion. The average current prices for statuary marble in blocks, are from three to five sovereigns per foot cube, at the wharf; the prices for slabs, therefore, per foot super, in inches of thickness, will be the twelfth part thereof, severally equal in value to 8*s.* 4*d.* per foot; to which should be added, the sawing, polishing, profit, &c. And, by these means, equitable prices per foot super may be ascertained for statuary chimney-pieces, by admeasurements; but we recommend the plan first proposed, that is, to contract for price, which supersedes any admeasurement. Inferior statuary is set only for ordinary chimney-pieces, and for rooms correspondent with its quality, and it is properly estimated: the price being about half the estimated value of the former at per foot cube.

Blue-veined marble.

Blue-veined Italian marble is, perhaps, next in quality to the inferior Statuary, and by most persons preferred; the current price, in the block, is about two guineas per foot cube at the wharf.

* The *Mart* for works of this description, in London, is the *New Road*; but specimens may be seen at 315, Oxford Street, where orders are received, by the agent of an eminent artist, for sculptured chimney-pieces and monuments upon the most economical principles.

Dove marble much approved.

Dove Marble.—This beautiful stone, which approximates to the soft blue colour of the Dove's plumage, is in high estimation, and the chimney-pieces made with it produce the most pleasing effect; the value per foot cube, at the wharf, is about two guineas.

Kilkenny and Limerick marble.

The Galway, Kilkenny, and Limerick Marbles, which are so much estimated in Ireland, and in this country also, is worth from 25*s.* to 30*s.* per foot cube.

Kilkenny subject to change its colour.

The Kilkenny Marble, which is of a pleasing blue-black when polished, in the course of time will change its colour by the heat of the fire, and will continue to do so until it assumes a bluish freckle.

Limerick and Namur.

The Limerick Marble is of a beautiful jet-black, and, when polished, is equal, if not superior, to the *Namur.*

Brocatella, Sienna, and Namur.

The Brocatella, Sienna, Verd Antique, and Namur, which are foreign marbles, and have been in high estimation, are now very seldom introduced in our modern buildings. The quarries of Great-Britain have not, at present, produced any superior marbles: the best we have seen are those from the counties of Devŏn and Derby; nor have we any worthy of being compared with those of Ireland, the most approved of which now in use have been noticed, and their current average market prices announced, at per foot cube; which, with the aid of the instructions given, it is presumed, will enable persons desirous of estimating the detailed value, to ascertain it upon principles which cannot be disputed.

English and Irish marbles. Equitable principles of valuation.

	£.	s.	d.	
Statuary marble, per foot cube, from £3. to	5	0	0	Prices of statuary.
Plain work, per foot super	0	5	0	
Sunk-work, do.	0	10	0	
Moulded-work, do.	0	15	0	
Statuary marble in chimney-pieces, with slabs, about one inch thick, per foot super	0	18	0	Slabs.
Do. 1¼ in. thick, do.	1	0	0	
Do. 1½ in. do. do.	1	2	0	
Circular plain-work to statuary, do.	0	10	0	Circular work.
Do. sunk, do.	0	15	0	
Do. moulded-work, do.	1	0	0	
Inferior statuary, 1 inch thick, in slabs, do.	0	12	0	
Veined marble, per foot cube	2	10	6	Average prices of veined marble.
Plain work, per foot super	0	5	0	
Sunk do. do.	0	10	0	
Moulded do. do.	0	15	0	
Veined marble chimney-pieces, with slabs, about 1 inch thick	0	9	6	Veined slabs.
Do. 1¼ in. thick	0	10	6	
Do. 1½ in. thick	0	11	6	
Circular plain work to veined marble, at per foot super	0	10	0	Circular work.
Do. sunk work to do.	0	15	0	
Do. moulded work to do.	1	0	0	
Dove marble slabs, about 1 inch thick, do.	0	13	0	Dove, Kilkenny, and black.
Kilkenny do. do.	0	10	0	
Do. black, Galway, and Limerick	0	10	0	Average prices
Single reeds, per foot run	0	1	2	of labour,

		£.	s.	d.
On Marble chimney-pieces, per foot run, &c.	Flush-beads in panels, per foot run	0	1	4
	Astragals to neckings, do.	0	2	3
	Back-joints, do.	0	0	8
Cavettos.	Small hollows, do.	0	1	3
	Single beads, do.	0	1	4
	Double beads, do.	0	1	8
	Treble beads, do.	0	2	4
Mouldings, sinkings, reeding, &c.	Moulded fronts to 5-inch pilasters, do.	0	5	0
	Sunk rebates, do.	0	1	0
	Backings to pilasters, do.	0	0	6
	½-inch flutings, do.	0	1	0
	¾-in. do. do.	0	1	6
	1-in. do. do.	0	2	0
Corners.	Plain rounded corners, do.	0	1	2
	Reeded do. do.	0	1	8
	Turned pateras, per pair	0	8	0
Cleansing, re-setting, &c.	Old chimneys polished and re-set, per foot super	0	2	9
	Do. cleaned and re-set, do.	0	1	4
	Do. jointed and re-set, do.	0	0	11
	Do. ripped, polished, and re-set, do	0	3	3

Masons' and Stone-cutters' Day-Prices, in London.

		s.	d.
Carvers, masons, and labourers, per day.	Carver in Marble, per day	10	0
	Do. in Portland, do.	8	0
	Mason or Stone-cutter, do.	6	0
	Labourer, do.	3	6
	Polisher, do	4	0
	Mortar, per hod	0	7
Materials.	Iron chimney-cramps	0	6
	Plaster, per bag	1	6
	Fine ditto, do.	1	10
	Roman cement, per bushel	4	6

CHAPTER IV.

On Plasterers' Work.

Primitive and intrinsic value of plastering.

THE intrinsic value of considerable portions of Plasterers' Works depend upon the qualities of the laths, which are of three sorts. For instance, the first are called *single fir laths*, which are the thinnest; the second size are somewhat thicker, and are called *lath and half;* and the third size are twice the thickness of the first, and are called *double fir laths.* Their general lengths are 3 feet; and 25 nailed, at proper distances, will cover about one square yard.

Laths.

On the value of laths will, in a great measure, depend the worth of ceilings, and stucco-work on walls and partitions, &c. It is, therefore, essential in affixing the value upon plasterers' work, first to inquire into the prices of the different sorts of laths at the various periods the works are executed, as well as into the prices of lime, sand, hair, and other materials.

Perhaps there is not any artificer's work so easy to measure as plasterers', nor any so difficult to value as the ornamental parts; but, where a regular system is adopted, this apparent difficulty ceases, by degrees, as valuators become familiar with their subject. **How to measure plastering.**

Plain cornices, under 9 inches girt, should be measured in running feet, and all above those girts in superficial feet. **To measure plain cornices.**

The plain parts of ornamental cornices should be first measured, as plain, and then the several enrichments thereon, taken by feet running measure, which, being valued separately, and added to the plain work, will determine the correct value at per foot superficial. **To value ornamental plastering.**

Plastered ceilings, partitions, walls, and rough-casting, &c., should be measured by the yard: the principal things to be remembered are, to deduct the chimnies, doors, and windows, &c., from the partitions and walls, and the cornices, &c. from the ceilings, making proper allowances for the laths, and the first or scratched coat of plastering under the cornices; the same allowances should also be made in measuring the sides of walls and partitions, where the cornices dip several inches below the superficial faces of the ceilings. **Walls, partitions, &c.** **Deductions of doors, windows, &c.**

Roman Cement.

Equal portions of clean sharp grit sand, mixed with this cement, will form the most durable of stucco coverings upon old and new brick-work. If the sand is wet or damp at the time it is mixed with the cement, it should be instantly diluted with water, and used as quick as possible; for, when applied upon walls, it requires incessant trowelling until it sets. So soon as finished, it should be *frescoed* with colour, composed of five ounces of copperas to every gallon of water, mixed up with as much cement and fresh lime as will produce the effect required. When the entire of the work is thus covered, and has assumed an uniform colour, it should then be *frescoed*, or tinted, in imitation of Portland, Bath, or such description of Free-stone as may be required to represent the most scientific or well-bonded masonry. **Roman Cement.** **Mode of trowelling and frescoing.** **Colouring of stucco.**

In country places the best burned stone-lime, well incorporated with clean sharp sand, diluted with water, is used for covering the outsides of buildings; and where the materials are unexceptionable, it is considered a good substitute for Roman Cement; and in Ireland, where the lime is many degrees superior to the English, the architects prefer their own country lime to our Roman Cement, except for particular purposes, as in making mortar for water-works, and similar uses, for which, perhaps, it cannot nor has ever been excelled. **Common stucco in the country.** **Irish lime superior to any other.**

AVERAGE PRICES

OF

PLASTERERS' MEASURED WORKS

IN ENGLAND, IRELAND, AND SCOTLAND.

		s.	d.
Whiting, colouring, washing, stopping, &c.	Lime-whiting, once done, per yard super	0	2
	Do. twice done, do	0	2½
	Scraping, stopping, washing, and whiting, to old ceilings, do	0	3½
New and old work.	New work, white only	0	2
	Do. to new plain cornices, per foot run	0	1½
	Do. to old cornices, do	0	1
	If ornamented, in proportion.		
	Wash, stop, and white, to old ceilings, slightly ornamented, at per yard	0	5
	Do. richly ornamented, do	0	10
	Do. where the panels are deep and the ornaments require great care, do.	1	3
Distemper, &c.	Do. in distemper, to ceilings, &c. per yard	0	3½
	Do. to single or plain cornices, &c. per foot super	0	1½
	Do. to ornamented, do	0	2½
	Do. do. with broad soffits, do	0	3
	Do. to enriched ceilings	0	3
Plain mouldings, colouring, &c.	Plain mouldings cleaned, stopped, and whited, at per foot run	0	1½
	Common colouring, at per yard	0	3
	Cream, or buff colouring, do.	0	5
	Do. blue or French grey, &c.	0	6
Chimnies, &c. rendered.	Common sized chimnies, rendered and blocked, each	1	6
	Walls rendered, one coat, per yard	0	7
	Do. and set with fine stuff, do.	0	9
	Do. circular do. do	1	0
	Do. floated and set, do	1	3
	Do. circular do	1	7
	Do. to groins	1	10
Lathing and plastering.	Lathing only, including nails and labour, at per yard	0	10
	Do. and one coat of lime and hair, do	1	3
	Do. and set with fine-stuff, do.	1	6
	Do. circular, do	2	0
	Lathing, with two coats of lime and hair	1	10
	Do. and set with fine-stuff	2	0
Floating, &c.	Floated do. and set in white do	2	1
	Do. to ceilings only, do	2	3
	Do. to groins do. and circular, do	2	6
	Do. finished on laths and trowelled, do	2	8

	s.	d.	
Do. plain frieze and set, per foot superficial	0	4	Soffits, &c.
Do. and soffits, do. do.	0	5	
Do. to heads of niches, do.	0	8	
Rough-casting on laths, at per yard	2	0	Rough-cast.
Do. on brick-fronts, or other brick-work, two coats, do.	3	6	
If circular, add one-sixth, and charge for putting-up and taking down scaffolding, &c.			
Bastard-stucco on brick, at per yard	1	6	Bastard-stucco.
Circular do.	1	11	
Bastard-stucco on lath, do.	2	4	
Circular, do.	2	11	
Trowelled-stucco on bricks, do.	2	0	Trowelled work.
Circular do. do.	2	6	
Trowelled-stucco on lath, do.	2	10	
Circular do. do.	3	6	
Do. on laths and panelled, do.	3	9	
Do. in heads of niches, at per foot super.	0	9	
Rustic raised and champhered, do.	1	0	Rustic work.
Plain fascias raised, do.	0	10	
Do. in keys to arches	1	2	
Raised panels, or margins, according to their widths, from 5*d.* to 7*d.* and 9*d.* per foot run.			Paneling.
Moulded do. in proportions thereto.			
Groins, at per foot super	0	6	
Do. on lath	0	8	
Beads and quirks, at per foot run	0	4	Beadings, &c.
Do. double do.	0	6	
Circular beads and quirks, do.	0	6	
Do. double, do.	0	8	
Arris', do.	0	1	
Common quirk, do.	0	$1\frac{1}{2}$	
$4\frac{1}{2}$-inch reveals to windows, at per foot run	0	5	Reveals.
Circular do.	0	6	
9-inch do.	0	10	
Circular do.	0	11	
Soffits on laths, floated and set, at per foot super	0	4	Soffits and friezes &c.
Do. circular, do.	0	5	
Do. elliptical, do.	0	6	
Circular soffits, with ogees or ovolos, including beads in 3-inch sunk panels in laths, do.	1	8	
Do. bead and flush, do.	1	2	
Friezes in laths, floated, do.	0	3	
Do. and set, do.	0	4	
Plain cornices, 3-inch girt, at per foot running measure	0	3	Cornices, &c.
Do. 4-inch, do.	0	4	
Do. 5-inch, do.	0	5	
Do. 6-inch, do.	0	6	

		s.	d.
Cornices.	Plain cornices, 7-inch girt, at per foot running measure	0	7
	Do. 8-inch, do	0	8
	Do. 9-inch, do., and all above this girt should be charged after the rate of, per foot superficial	1	0
Mouldings, per foot run.	Astragals, ovolos, or ogees, &c., at the bottoms of friezes, or when introduced round panels, &c. per foot run	0	3½
	Do. circular do	0	4½
	Reed mouldings to form panels, do	0	5
	Circular do. do	0	7

Mitres, more than four. Whenever it occurs that more than four mitres are introduced in the cornices of rooms, all above that number should be charged as extra, at per mitre, according to the labour; and whenever the works are circular, one-third or one-fourth should be added to the charges over and above the prices for straight work.

		s.	d.
Cornices and enrichments.	All the plain parts or masks of the cornices to be first measured, and charged at per foot super	1	0
	Enriched mouldings which are cast solid, and girt one-inch, to be charged after the rate of *3d.* per foot run, and all other enrichments in cornices, &c. after the same ratio; if separately, 1*d.* per foot in advance.		
Cast mouldings, per foot run.	Enriched mouldings, 1-inch girt	0	3
	Do. 1½-in. do	0	4½
	Do. 2-in. do	0	6
	Do. 2½-in. do	0	7½
	Do. 3-in. do	0	9
	Do. 4½-in. do	0	10½
	Do. 5-in. do	1	0
	If circular or elliptical, add one-fourth.		
Cornices of the Orders in Architecture, per foot run.	Plain dentil cornices, per foot super	1	4
	Do. with Grecian Doric blocks and bells, do	1	6
	Do. with plain Ionic modillions, do	1	8
	Do. with enriched Corinthian modillions, do	2	0
	Do. with plain Tuscan blocks, do	1	5
	Do. with plain Doric mutules, do	1	6
	Do. with enriched mutules, including the bells or drops, with flowers in the coffers, &c. do	2	9
	Do. including the tryglyphs, metopes, flowers, and architraves, do	3	0
Enrichments in soffits, &c. per foot run.	Running ornaments, or soffits, friezes, and strings, 9 inches wide, per foot run	2	3
	Do. 8 inches wide, do.	2	0
	Do. 7 inches wide, do	1	9
	Do. 6 inches wide, do	1	6
	Do. 5 inches wide, do	1	3

Extra charges for modelling, &c. Where enrichments are expressly modelled from original drawings, the expenses of modelling should be allowed, independent of the prices charged for the work in the measured bills.

Common outside stucco-work or cement.

The best outside stucco-work, performed with Dorking or any other approved lime, mixed with clean sharp sand, on old or new brick-work, neatly jointed, at per yard superficial, is worth from 1*s.* 9*d.* to 2*s.* per yard.

Do. on laths.

If on good laths, from 2*s.* 9*d.* to 3*s.* per yard; if circular on the plan, one-sixth may be added to the prices.

	s.	*d.*	
Fascias and pilasters, per foot super	0	$3\frac{1}{2}$	Do. outside fascias, cornices, &c.
Plain cornices, per do.	1	6	
Arris', per foot run	0	1	

Frescoing, &c. on stucco.

The colouring performed in a neat uniform manner, to imitate Portland or Bath stone, 9*d.* per yard; and, if frescoed, *one shilling* may be charged.

Scaffolding.

The expenses of erecting and taking down scaffolding may be charged in addition to the above, but not for the use of it, as the prices are adequate thereto.

	s.	*d.*	
Roman cement, on the outside of walls, including all materials, at per yard super	4	0	Parker's Roman cement.
Do. including colouring or frescoing, to imitate the bonding of masonry, ditto	5	0	Roman cement and colouring on laths.
Do. if executed with stout laths	6	0	
Pilasters, fascias, belting-courses, strings, &c. per foot super	0	6	Pilasters, belting-courses, &c.
Plain cornices, do.	2	2	
Sinkings, per foot run	0	5	Sinkings, arris', &c.
Arris', do.	0	2	
9-inch reveals, do.	0	8	
$4\frac{1}{2}$-in. do. do.	0	5	

Additions may be made where circular.

One-fourth, one-fifth, or *one-sixth,* may be added to any of the before-mentioned prices, if the works are circular; the prices for which should be regulated in proportion to the sharpness of the curvatures, &c.

Dubbing out in Roman cement.

The consequent expenses of dubbing out, to render the surfaces even before the Roman cement or stucco is laid on, should be accounted for; likewise the correct worth of the cement used in making such preparations, together with the time consumed in erecting and taking down the scaffolding, as likewise the cost of tar-twine, iron spikes, and such materials as may be found indispensably necessary in forming artificial and substantial projections for cornices, pilasters, &c.

Cornices, &c.

How to value additional thicknesses, in pilasters, friezes, &c.

One bushel of cement, if used with care, will cover from three to four yards super, provided it is mixed with equal portions of clean, sharp, grit, river, or sea, sand. Where additional thicknesses are laid upon the face of a wall, in order to form pilasters not provided for in the brick-work, such additional thicknesses should be measured as double, treble, or quadruple, in proportion to such thicknesses; and the same principle should be adopted in accounting for the extra quantities of cement used in window-sills, string-courses, pilasters, friezes, and all manner of architectural decorations. In ascertaining the worth, therefore, of external stucco-work, great pains should be taken where the parts are complicated, nor should the measurer forget to make all manner of equitable allowances, or to deduct the openings wherever they occur.

Prime cost of render and set.

The value of 300 pecks of lime, 400 pecks of sand, the cost of six days' work of a plasterer, labourer, and boy, including 10 bushels of hair, is nearly equal to the prime cost of 200 yards of render and set.

Do. of lath, plaster, and set.

The value, also, of 450 pecks of lime, 600 pecks of sand, the cost of 12 days' works of a plasterer, labourer, and boy, including 15 bushels of hair, 2 loads of laths, and 14 thousand nails, is nearly equal to the prime cost of 270 yards of lath, plaster, and set.

To find the value in any part of the world.

In order, therefore, to ascertain the correct value of common plastering, in the different parts of the kingdom, it will be necessary to enter into the detailed value of lime, sand, and workman's wages, with all the consequent expenses; and, by these means, the average prices of plastering may be arrived at, not only in any part of these countries, but in any part of the world.

Plasterers' Average Prices for Day-work, in London, &c.

		s.	d.
Day prices.	Plasterer, per day	5	9
	Labourer, do.	3	6
	Hawk-boy, do.	1	9
	Laths, per bundle	2	3
	Do. and nails	3	0
Laths, &c.	Lath-and-half, per bundle	3	6
	Do. and nails	4	0
	Lime and hair, per hod	0	10
	Do. for outside work, do.	1	0
Mortar.	Do. fine stuff, do.	1	6
	Stucco in do.	1	10
	Putty in do.	2	3
Plaster.	Plaster, per bag	1	4
	Do. fine, do.	1	8
Roman cement.	Roman cement, per bushel	4	6
	Dorking lime, do.	1	10
Sand.	River sand, do.	0	5
	Two-penny nails, per thousand	1	8
Nails, &c.	Cast nails, do.	0	10
Whiting.	Whiting, per dozen	0	4
	Best, do.	0	6
Size.	Double size, per firkin	6	0
	Do. per gallon	0	7
	Do. by the pound	0	4
Blue, &c.	Blue black, per do.	0	5
Modeller's wages and wax.	Modellers, when paid by day-work, are allowed after the rate of one day and a half, which is equal to 8*s.* 1½*d.* per day.		
	Wax for do. per pound	3	3

Scaffolding, turnpike, and cartage.

Cartage, turnpikes, and scaffolding, &c., to be charged in proportion to distances, and to the value of horse-hire at the respective seasons of the year the works are performed.

CHAPTER V.

ON THE AVERAGE PRICES OF SLATERS' WORKS,

IN ENGLAND, IRELAND, &c.

THE best slates which can be procured in Great Britain, are those which are raised in the quarries of North-Wales. The Westmoreland slates are by many persons strongly recommended; the colour of them is considered beautiful, being of a light blue green, while that of the Welsh slates is chiefly sky-blue; some are of a purple cast, as are also those which are sent from the West of England. In the quarries of St. John's Town, in the North of Ireland, excellent slates are procured; but the latter are inferior to those from North-Wales, the best of which are the Donnybole Rag, Imperial, and Queen, slates; for neatness, for strength, and where fine workmanship is required, the latter cannot be excelled; any of the former, for each sort being thick, are well calculated to resist the effects of stormy weather.

Westmoreland beautiful green.

Purple slate from Devon.

The *Duchess, Countess, Ladies,* and *Doubles,* known by these names, are likewise good slates; and, where they are not exposed to the effects of a tempestuous climate, they answer the same purpose as the most expensive slates.

These slates not fit for exposed situations.

The Ton, Imperial, Queen, and Patent Slatings, are each highly estimated; but the former have the preference, for, when laid on roofs judiciously constructed, they may be relied on to keep out the wet; whereas the latter are considered unsafe, unless great pains be taken to make weather-tight seams to cover the joints: another objection renders it unpopular with those who are acquainted with the fatal effects of the *dry-rot*. The *duchess* slating is a very neat, light, and elegant, covering, but should never be introduced in an elevated situation, or in those parts of the country subject to violent hurricanes; and all light slates, in such situations, are objectionable for similar reasons. On this subject we may remark the more strongly, from having seen the melancholy effects of light slates on the roofs of buildings in mountainous countries, as well as near the sea.

Ton, Queen, and patent slates. &c.

Duchess slating.

Slaters' works are measured by the square of one hundred feet superficial; the contents of a roof is found by multiplying the length of the ridge by the breadth, from eave to eave, making allowances of one foot on each side in the girt, for the double rows of slates at the eaves; and allowances of one foot for cuttings to the hips and valleys, by their lengths, should be made; and six inches by the lengths for all manner of cuttings to dormers, chimnies, or other breaks, the superficial contents of which should be deducted from the entire quantities, if included in the general dimensions previously taken.

How to measure and value slaters' works; the length of the ridge and girt of the inclined planes.

One square of Welsh rag or Westmoreland slating, weigh very nearly half a ton, or 10 cwt.

Weight of slates per square.

One square of Duchess, Countess, or Lady, slating, weigh about one-quarter of a ton, or near 6 cwt.

Quantities requisite for covering squares.

A ton of Welsh rags will cover about $1\frac{1}{2}$ or 2 squares; a ton of Westmoreland the same; and one ton of Queen slates nearly 2 squares.

1000 Duchess slates will cover about 9 squares.

1000 Countess do. will cover 5 squares.

1000 Ladies' do. will cover $3\frac{3}{4}$ squares.

1000 Tavistock do. will cover $2\frac{1}{4}$ squares.

		ft.	*in.*		*ft.*	*in.*
Sizes of common slates.	Duchess slate, average size is	2	0	by	1	1
	Countess do. do.	1	8	..	0	10
	Lady do. do.	1	3	..	0	8
	Doubles do. do.	1	1	..	0	6
Do. of superior slates.	Patent Wyatt do. do.	2	6	..	2	0
	Imperial do. do.	2	6	..	2	0
	Queen do. do.	3	0	..	2	0
	Rag do. do.	3	0	..	2	0

		£.	*s.*	*d.*
Prices, per square, for slating.	The best Westmoreland slating, on boards, nailed with 4*d.* clout nails, per square	4	4	0
	Do. on the best oak laths, and rendered in the inside with good lime and hair	4	10	0
	Donnybole rag slating on boards, at per square	3	10	0
	Best Welsh rag and Queen, do. from £3. 5*s.* to	3	7	0
Minor slating, at per square.	Duchess slating, do.	2	5	0
	Countess do. do.	2	2	0
	Ladies' do. do.	2	0	0
	Tavistock slating on boards	2	3	0
	Do. on oak laths, and pointed	3	3	0
Slaters' dry-work.	Slater, in London, &c. per day	0	5	6
	Labourer, do.	0	3	6
Slates, per 100.	Large slates, at per hundred, from 10*s.* to	0	12	0
	Tavistock do. do.	0	7	0
	Doubles do. do.	0	5	0
Nails, do.	Four-penny clouts painted, do.	0	0	4
	Six-penny do. do.	0	0	6
	Eight-penny do. do.	0	0	8
Mortar.	Lime and hair, per hod	0	0	10
Slates, per ton.	Queen slates, per ton	4	10	0
	Rag, do.	4	5	0
	Imperial, do.	5	5	0
	Westmoreland, do.	6	0	0
Duchess slates, &c. per 1000.	Duchess slates, per 1000, long hundreds	13	13	0
	Countesses' do. do.	9	9	0
	Ladies' do. do.	4	15	0
	Doubles do. do.	3	3	0

The foregoing are the average prices of slates and slaters' work in London, Dublin, &c.; but, if executed in the country, the land and water-carriage should be added.

CHAPTER VI.

ON PLUMBERS' WORK, IN ENGLAND, &c.

THE average price of cast, sheet, or milled lead, as well as every other description of lead-work, must entirely depend upon the current price of pig-lead, the market price of which regulates the average cost of every article made of this valuable metal. The first thing, therefore, to be done in putting a value upon lead works, is, to ascertain, by the price-current, the mercantile value of pig-lead per ton or per hundred weight; to which should be added, all manner of expenses in the manufacture of the metal up to the period of its being put into the scales, and re-weighed. The prime cost being ascertained, the next step to be taken is to add the profit, which should be always regulated and proportioned according to the extent of the credit required, as well as the risk of bad debts. Now, as the price of pig-lead is constantly varying, and in the same ratio as other valuable metals, it will be impossible to fix any thing like an average value upon lead-work; that is, with any degree of certainty, so as to be relied on for any length of time. The utmost, therefore, which can be done, to guide those who require printed information, is to give some general prices, with Tables to regulate according to circumstances.

How to value milled and cast sheet-lead.

Price regulated by the extent of credit.

Plumbers cast sheet-lead work is charged by the hundred weight, containing 112 pounds, which is of two sorts; that is, cast sheet-lead and milled sheet-lead. Solder is charged by the pound, and lead pipes by the yard or foot running measure.

Lead sold by the hundred weight.

New cast sheet-lead, 7 pounds and upwards to the foot super, laid in hips, ridges, gutters, valleys, flats, &c., is worth, at the present price of pig-lead, from 32*s.* to 34*s.* per hundred.

Hips, ridges, &c.

Laying the same, including solder where required, is worth from 4*s.* to 4*s.* 6*d.* and 5*s.* per hundred.

Laying, &c.

	£.	s.	d.	
Milled lead to hips and ridges, under 7 lb. weight, per foot super, £1. 14*s.* to	1	16	0	Milled lead.
Labour in laying do., including solder, &c. per cwt.	0	4	6	
Circular oval or square leaden cistern-heads, including ornaments, each	1	18	0	Cistern-heads.
Holdfasts, solder, and labour, to fixing the same	0	5	0	
Water-cisterns, battened and ornamented in panels, &c. all at per cwt. fixed	3	0	0	Cisterns in panels, &c.
Sash-weights, per cwt.	1	16	0	Weights and old lead.
Old lead, in exchange, to be allowed for at the rate of, per cwt.	1	5	0	
If not in exchange	0	18	0	
Solder, per pound	0	1	2	Solder, &c.

OBSERVE.—*The expense of laying down lead is generally charged by the day, unless it is agreed to be included.*

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Table, showing the Weight of Leaden Pipes, according to their Sizes.

Weight of leaden pipes.

$\frac{3}{4}$-inch pipes in the bore, weigh 10 lb. to the yard.
1-in. do. .... 12 lb. do.
$1\frac{1}{4}$-in. do. .... 16 lb. do.
$1\frac{1}{2}$-in. do. .... 18 lb. do.
2-in. do. .... 24 lb. do.
And for larger bores in proportion.

A Table, very useful in buying and selling Lead, commencing with £2. 2s., being a fair Average Price, in reference to the Value of Lead during the last Twenty Years.

Lead per cwt. and pound.

£.	s.	d.		d.	
2	2	0	per cwt. is	$4\frac{1}{2}$	per pound.
1	19	8	do.	$4\frac{3}{4}$	do.
1	17	4	do.	4	do.
1	15	0	do.	$3\frac{3}{4}$	do.
1	12	8	do.	$3\frac{1}{2}$	do.
1	10	4	do.	$3\frac{1}{4}$	do.
1	8	0	do.	3	do.
1	5	8	do.	$2\frac{3}{4}$	do.
1	3	4	do.	$2\frac{1}{2}$	do.
1	1	0	do.	$2\frac{1}{4}$	do.
0	18	8	do.	2	do.
0	18	4	do.	$1\frac{3}{4}$	do.
0	14	0	do.	$1\frac{1}{2}$	do.

Allowance in buying and selling old lead.

In buying or selling old lead, it is customary to make allowances of from four to six pounds to the cwt. more or less, according to the state of the lead, for dirt. It is also customary to pay ready money for old lead, unless taken in exchange.

		£.	s.	d.
Rain-water pipes.	4-inch rain-water pipes, per foot	0	3	8
	$3\frac{1}{2}$-in. do. do.	0	3	2
	3-in. do. do.	0	2	8
Soldered pipes.	2-inch soldered pipes, per foot	0	4	8
	$1\frac{1}{2}$-in. do. do.	0	3	4
	$1\frac{1}{4}$-in. do. do.	0	2	10
Water pipes.	2-in. water-pipes, per foot	0	3	10
	$1\frac{1}{2}$-in. do. do.	0	2	8
	$1\frac{1}{4}$-in. do. do.	0	2	2
	1-in. do. do.	0	1	9
	$\frac{3}{4}$-in. do. do.	0	1	3
	$\frac{1}{2}$-in. do. do.	0	0	9
Joints.	6-in. joints, each	0	9	6
	5-in. do. do.	0	8	6
	4-in. do. do.	0	7	9
	3-in. do. do.	0	7	0

	£.	s.	d.	
2-in. joints, each	0	6	0	Joints.
1½-in. do. do.	0	5	0	
1¼-in. do. do.	0	3	9	
1-in. do. do.	0	2	9	
¾-in. do do.	0	2	6	
½-in. do. do.	0	2	0	
6-in. funnel-pipes, per foot	0	7	0	Funnel-pipes.
5½-in. do. do.	0	6	6	
5-in. do. do.	0	6	0	
4½-in. do. do.	0	5	0	
4-in. do. do.	0	4	6	
4-in. pumps, complete	4	14	6	Pumps.
3½-in. do.	4	0	0	
3-in. do.	3	10	0	
1½-in. do.	2	12	6	
4-in. socket pipes	0	4	0	Socket-pipes.
3½-in. do.	0	3	6	
3-in. do.	0	3	0	
2½-in. do.	0	2	6	
2-in. do.	0	2	0	
Patent valve water-closets, with the apparatus, all complete	6	6	0	Water-closets.
Common pan water-closets, with valves, all complete	3	10	0	
4-in. force lead-pumps, all complete, at	6	6	0	Force lead-pumps.
3½-in. do. do.	5	5	0	
3-in. do. do.	4	4	0	
2½-in. do. do.	3	15	0	
6-in. brass grates, and fixing, each	0	7	6	Brass grates, with lead air-traps, &c., for sinks.
5-in. do. do.	0	6	6	
4-in. do. do.	0	5	6	
3½-in. do. do.	0	4	6	
3-in. do. do.	0	4	0	
3-in. brass grates only, each	0	2	9	Brass grates only.
2½-in. do. do.	0	2	3	
2-in. do. do.	0	1	9	
1½-in. brass ferrules	0	7	6	Brass ferrules.
1¼-in. do. do.	0	6	6	
1-in. do. do.	0	5	0	
¾-in. do. do.	0	2	6	
2-in. washers and wastes	0	10	6	Washers and wastes.
1½-in. do. do.	0	8	6	
1¼-in. do. do.	0	6	6	
1-in. do. do.	0	5	6	
¾-in. do. do.	0	4	6	
Inch brass bosses, each	0	2	9	
¾-in. do.	0	2	3	
½-in. bosses	0	1	10	Bosses.
2-inch brass valves, each	0	10	6	

		s.	d.
Brass valves.	$1\frac{1}{2}$-in. brass valves, each	8	6
	$1\frac{1}{4}$-in. do	7	6
	1-in. do	6	0
	$\frac{3}{4}$-in. do	4	6
Copper balls, with iron rods.	$1\frac{1}{2}$-in. copper-balls, with rods, complete	8	0
	$1\frac{1}{4}$-in. do. do	6	0
	1-in. do. do	4	6
	$\frac{3}{4}$-in. do. do	2	6
	$\frac{1}{2}$-in. cocks	2	0
Basins.	Plain water-closet basins, each	10	0
	Valve do	15	0
Brass cocks, &c.	Five shilling stop-cocks or bibb, each	6	0
	Five-shilling butt, do	6	6
	Four-shilling top bibb or ball, do	5	0
	Four-shilling ball-cock, ball-boss, and fixing	10	6
	Four-shilling butt	5	6
	2-inch stop or fire-cock, per pound	1	8
	$1\frac{1}{2}$-in. stop-cock, each	15	0
	$1\frac{1}{4}$-in. do. do	13	0
	1-in. do. do	10	0
	Elm-pipes, 4-in. bore, hooped and jointed, at per foot run	2	0
Day prices.	Plumber, per day	5	6
	Labourer, do	4	6
	Solder, per pound	1	2
	Wall-hooks, each	0	$2\frac{1}{2}$

CHAPTER VII.

On Painter's Work.

Use of paint on the outside.

Common paint, used in painting the outside of wood and iron-works, together with the interior of our public and private edifices, is considered to be of great service in the preservation of the several materials it covers, as well as being ornamental. Of the utility of paint upon planed wood and wrought-iron, on the outside of buildings, not any doubt can be entertained, inasmuch as the turpentine, oil, and white-lead, mixed together, form an excellent coating for wood that is planed, and iron that is wrought; the latter of which it preserves from rusting, and the former from being injured by the effects of wet and dry weather, or the scorching of the sun's heat; but whether paint be really a preservative to wood in the interior of our habitations, is a question of considerable doubt. From the moment that oak, fir, or any other species of wood, is hewn, it is presumed to be in a state of putrescence, that is, on its course to

Utility of paint.

final decay; and, in order to preserve it when converted to general purposes, it is painted, with some exceptions, on one side, whether used externally or internally. Fir, oak, or any other description of wood, which is used for internal purposes, and which is not painted, will endure the effects of time much longer than when it is painted; and hence it follows, that paint, in the inside of our buildings, although ornamental, does not, in our opinion, contribute to the duration of the wood; but, on the contrary, in many instances, where the wood is not well seasoned, or is diseased, it accelerates decay, and the effects of what is called the *dry* or *damp rot*.

Fir or oak will last longer without paint.

For example: Suppose a building, erected with brick or stone, and, so soon as covered in, the walls were lined with deal wainscot partitions, what would be the consequence? The dry-rot; arising from the pores of the wood being saturated with white-lead, oil, and turpentine, which presently becomes very hard; consequently, the latent vegetative powers of the wood are destroyed, and a species of *fungus* rapidly generates on the opposite side next the wall, partly occasioned by the pores of the wood being closed on one side, and partly by the want of a circulating medium of pure atmosphere on the other; and hence it is manifest, that fir, deal, or any other description of wood, which is intended to be painted, should be well seasoned and perfectly dry, whether to be used internally or externally.

Wood subject to dry-rot, under particular circumstances.

Vegetative powers of wood when cut.

Now, after what has been stated, it may appear strange, but nevertheless it is true, that oak, fir, and every other species of forest-wood, which is, or may be, used externally, will last longest without any paint, provided the materials are *not planed*, but are used in their rough state as they come from the sawyer's-pit; the frizly or wiry fibres of the wood upon the external surfaces of rough-sawn boards prevent the wet from penetrating, and the sun's heat from scorching: this species of natural coating to the wood acts, in degrees, similar to the fleece upon the shepherd's flock, which not only protects his herd from the effects of *wet* and *cold*, but also against the effect of the sun's heat: the truth of this is proved by the peasantry of Ireland, who, not only in the winter, but likewise in the summer, wear large woollen coats, which they account for as helping to keep out the summer's scorching heat, and winter's piercing cold. Yet, notwithstanding, what has been said and written upon our subject, paint must be allowed to be extremely grateful and pleasing to the eye, and effects the most agreeable sensation; for, without paper or paint, our modern apartments would present the most dreary aspect. To the paper-maker and painter, therefore, we are greatly indebted for the pleasing and cheerful appearance of our apartments; nor are we less indebted to the residue of our fellow-subjects and artisans in building, who, more or less, contribute to our comforts.

Wood exposed better without paint, if not planed.

Comfort of paint and paper.

The greatest portion of painters' works are ascertained in square yards. Every part being measured where the brush touches: it is, however, usual to measure all manner of narrow members by the foot running. For example, surbases, skirtings, &c.; sashes by the dozen, counting both sides, and sash-frames by the piece, reckoning one inside and one outside, that is, when painted on both sides; and iron railings and balusters, by the lengths and girts, in the same manner as if they were painted on both sides.

Modes of measuring painting.

The value of painting dependent on the qualities of white-lead, &c.

The value of painting will, in a great measure, depend upon the qualities of the materials: if the painter converts his white-lead into paint, so soon as it is made, the work will presently turn *yellow*. White-lead, for paint, requires to be kept some time in casks, and should undergo the operation of bleaching; and, if the materials of every denomination to be used in painting are not the best, the works will very soon exhibit the appearances mentioned. The profits upon painters' work are handsome, and such work ought, therefore, to be performed in the best manner, and with the best materials.

Mode of finding the value of paint.

The value of painting should be ascertained by making minute calculations of the quantities of white-lead, turpentine, and oil, which are necessary to perform given numbers of square yards, with references to the age and qualities of the materials; if the admixtures are not proportioned and graduated so as to produce suitable paints of their various denominations, the works will presently shew the poverty of the ingredients, nor will they give the satisfaction required. Painters' works are frequently advertised to be done at 25 and 30 per cent. under the customary measure and value prices; but, if such works are properly executed, and the value honestly ascertained, it will be impossible for any respectable tradesman to make such deductions without great injustice: if the works are well done, and with good materials, they will merit the subsequent prices; but, if badly done, one-half or two-thirds may be a fair consideration. One-third of the value of painting may be estimated for the labour, that is, for common painting; but, for fancy-works, which require great attention, taste, and judgment, two-thirds of the value of the painting will not be more than equivalent for the labour.

Advertising painters.

Great saving in having the work done well.

Painters' works, which are badly performed, will require to be done every other year; if well done, every fourth, fifth, or sixth year, in proportion to the qualities of the materials and workmanship.

AVERAGE PRICES OF PAINTERS' WORKS,

IN ENGLAND, IRELAND, AND SCOTLAND.

		s.	d.
Common painting, per yard.	Common painting once in oil, including knotting and stopping, at per yard	0	4
	Twice do. do.	0	7
	Three times do. do.	0	10½
	Four times do. do.	1	2
On stucco.	Once in oil, on stucco	0	5
	Do. twice, do.	0	8
	Do. three times, do.	0	11
	Do. four times, do.	1	3
Sanding.	Do. and sanded	1	6
	Four times done off a ladder, do.	1	8
	String-boards, newels, and moulded balusters, four times in oil, do.	1	6
Carved work.	Carved works once in oil, per foot super	0	3

	s.	d.	
Carved works, twice in oil, per foot super	0	4	
Do. thrice in oil, do.	0	5	
Clear-coal and finished, per yard	0	5	Clear-coal.
If any of the above works are flatted, 4*d.* per yard may be added.			
Best green, in distemper, on walls or paper, once done, at per yard	0	6½	Distemper colours.
Do. twice done, do.	0	8½	
Do. three times done, do.	0	10½	
And all others approximating in relative proportions.			
Sash-squares once in oil, at per dozen	1	0	Sashes and frames, &c.
Do. twice in oil, do.	1	6	
Do. three times, do.	2	0	
Do. four times, do.	2	6	
Sash-frames once in oil, each	1	0	Sash-frames.
Do. twice in oil, do.	1	6	
Do. three times, do.	2	0	
Do. four times, do.	2	6	
If any of the above squares or frames are flatted in the inside, add 5*d.* to each item.			
Iron casements according to their sizes, each from 6*d.* to	0	8	Casements, lights, &c.
Window-lights three times in oil, each	0	9	
Iron bars, of moderate sizes, each from 1*d.* to	0	1½	
Window-sills once in oil, each	0	5	Window-sills, average sizes.
Do. twice, do.	0	9	
Do. three times, do.	0	11	
Window-reveals once in oil, each, at	1	0	Window-reveals.
Do. twice in oil, do.	1	6	
Do. three times, do.	2	0	
Plain skirtings once in oil, per foot run	0	1	Plain skirting, 8-inch wide.
Do. twice in oil, do.	0	1½	
Do. three times, do.	0	2	
Do. four times, do.	0	3	
Torus skirtings once in oil, do.	0	1½	Torus skirtings, 12-inch wide.
Do. twice, do.	0	2	
Do. three times, do.	0	2½	
Do. four times, do.	0	3½	
Plain single cornices once in oil, do.	0	2	Cornices, from 6-in. to 9-in. girt, per ft. run.
Do. twice in oil, do.	0	2½	
Do. three times, do.	0	3	
Do. with fascia, do.	0	3½	
Cornices, with bed mouldings, do. twice in oil	0	3	
Do. three times in oil, do.	0	4	
Do. with enrichments, do.	0	5	Water-trunks, do.
Common 5-inch trunks, once in oil	0	1½	
Do. twice, do.	0	2	
Do. three times, do.	0	3	
Do. four times, do.	0	4	
Single cornices, twice in oil, per foot run	0	3	

		s.	d.
Outside cornices, from 10-in. to 12-in. girt, per ft. run.	Single cornices, twice in oil, with bed mouldings, per foot run	0	4
	Do. with modillions or dentils, do.	0	5
	Do. to stone-strings, 9-inches wide, do.	0	3
	Fronts of stone-copings, with throatings, do.	0	1
	If three times, in oil, add one-fourth to each of the above prices.		
French greys, blues, greens, grained wainscot, and mahogany.	Twice in oil, grey, per yard	0	9
	Thrice in oil, do. do.	0	11
	Four times, do. do.	1	2
	Twice in oil, blue, do.	0	9½
	Thrice, do. do.	1	0
	Four times, do. do.	1	3
	Twice in oil, green, do.	0	10
	Thrice, do. do.	1	1
	Four times, do. do.	1	4
Wainscot.	Twice in oil, grained wainscot, do.	1	8
	Do. varnished, do.	2	2
	Twice in oil, grained mahogany, do.	2	4
	Do. varnished, do.	2	10
White and rich colours, &c. per yard super.	Painting, done with the best bleached Nottingham lead, once in oil, and flatted dead white, per yard	0	9
	Do. twice in oil, do.	1	0
	Do. thrice do. do.	1	3
	Do. four times, do.	1	6
Carved work.	Once in oil to carved work, per foot super	0	4
	Do. twice do. do.	0	5
	Do. thrice do. do.	0	6
	Do. four times, do. do.	0	7
French grey flatted.	Twice in oil, and flatted French grey, per yard	1	4
	Thrice do. do.	1	7
	Four times do. do.	1	10
Blues, do.	Twice in oil, and flatted blue, do.	1	5
	Three times do. do.	1	8
	Four times do. do.	1	11
Greens, do.	Twice in oil, flatted green, do.	1	6
	If finished with olive green, French grey, or similar expensive colours, add from *4d.* to *5d.* per yard.		
	Twice in oil, and flatted, including doors, window-shutters, and wainscoting, panels, rails, and stiles, white and blue, per yard	1	10½
Imitations of wood, scientifically performed.	Wainscot or oak, at per foot super	0	3½
	Honduras mahogany, do.	0	5
	Hispaniola do. do.	0	7½
	Hare or satin-wood, do.	0	5
	Rose-wood, do.	0	10½
	Yew-tree, do	0	10
Mouldings.	Narrow mouldings in black, per foot run	0	1
	Grained, do. do.	0	1½
	Paneling, do. do.	0	1

	s.	d.	
Broad mouldings, in black, per foot run	0	1½	
Back-shadowed do. do.	0	2	
Vitruvian scrolls, lotus or honeysuckle ornaments, moderate sizes, each at	2	6	Ornaments.
Veined or dove marbling, at per foot super	0	3½	
Brocatella or Sienna, do.	0	6	Marbles.
Verd antique, do.	1	2	
Venetian marble	0	7	
Best copal varnishing, per yard	0	9	Varnishing.
Do. twice, do.	1	6	
Do. thrice, do.	2	3	
Best spirit varnishing, per yard	0	10	
Do. twice, do.	1	8	
Cleaning and varnishing, at per yard	1	2	Cleaning and varnishing.
Do. moderate sized squares, per dozen	1	2	
Do. larger, do.	1	4	
Do. size larger, do.	1	6	
Window beads, per set, to 12 square windows	0	4	
Do. sets of beads, including pulleys	0	8	
Common plain letters or figures, at per inch	0	0½	Plain writing in sunk letters, gilt do., &c.
Sunk do. do.	0	1	
Sunk or shadowed letters, &c. three colours, at per inch	0	1½	
Gilt letters under 3 inches, do.	0	2	Gilding.
Do. from 3 to 6 inches, do.	0	2½	
Do. from 6 to 9 inches, do.	0	3	
Do. from 9 to 12 inches, do.	0	3½	
When shadowed, add one half-penny; and, when double shadowed, one penny.			
Newells, hand-rails, base and surbase mouldings, once in oil, per foot run	0	1	Newells, hand-rails, base and surbase mouldings.
Twice do. do.	0	1½	
Thrice do. do.	0	2	
Four times, do.	0	2½	
Hand-rails grained, do.	0	3	
Do. and varnished, do.	0	5	
Painter, per day, in London	5	6	Painters' day-prices in London.
White lead, per lb.	0	9	
Putty, per do.	0	6	
Brushes, each	3	0	Tools, &c.
Tools, do.	1	4	
Prepared oil, per quart	2	4	
Turpentine, do.	4	4	

Common *Stone*, *Cream*, *Lead*, *Pearl*, and *Chocolate*, colours, should be all charged after the same ratio, as common painting; which works, together with the preceding, are performed by all the most respectable painters, paper-hangers, and decorators, at the before-mentioned rates, both in town and country. Party-colours.

CHAPTER VIII.

On Glaziers' Work.

How to value panes or quarries.

Glaziers' works are uniformly measured in feet, inches, and parts, and the true contents obtained by duodecimals, and the value arithmetically obtained in proportion to the number of superficial feet and inches, &c. contained in each of the panes or quarries. In considering the net worth of glass, references must be made to the prime cost, as well as to the exact sizes of each of the panes, with their respective superficial contents, which considered, together with the fair profits, should constitute the average prices: and it ought to be remembered that each of the panes should be measured separately, exclusive of the sash bars, and more especially where adequate prices are claimed, proportionate to the sizes of the panes, as in manner described. It is the custom, in many parts of the kingdom, to measure the entire sizes of the sashes, including all the wood work, for the quantities of glass, and to charge the superficial contents, as if the apertures were all fitted in with glass; and this custom is not only prevalent in Ireland, but also in many parts of England, Scotland, and Wales. The practice appears absurd to those accustomed to measure the net quantities; yet it is speciously justified in the parts adverted to, and sustained where permitted, upon the principle that the prices are uniformly the same for all the sizes of Newcastle glass used, &c.; that is, with reference to the qualities, which are usually identified in the places alluded to by the letters A, B, and C: the letter A denoting the *first* quality, the letter B the *second* quality, and the letter C the *third*. But without risk, we may venture to state that, in every part of the kingdom, it is usual, in measuring circular fan-lights, oval and all manner of circular windows, to measure the compartments of glass in the widest parts, as if the panes were cut for square windows; because, in cutting out the irregular compartments of glass for such apertures, there is much waste, and far more time expended, than if the windows were square: this custom is rational, and should always be complied with.

Method of valueing in some parts of England, &c.

On measuring circular work.

Bent-glass; how charged, and mode of burning

The qualities of *Bent*, *Plate*, *German*, and *Moulded Glass*, are each charged according to their respective qualities, as well as sizes. The panes of bent-glass are charged in proportion to the quickness of their curvatures; for in the operation of bending glass, which is performed by means of heat, the risk is considerable, where the curves are very quick; and in proportion to the risk the prices should increase. The value, therefore, of bent-glass will be sometimes *double*, *treble*, or *quadruple*, the prices of straight glass.

Qualities of Plate-glass.

Within the last twenty or thirty years Plate-Glass has become very much the fashion, insomuch as to supersede the use of the best White London-Crown, which, when it was manufactured and in use, was considered far superior to our best Newcastle-Glass, which is now used for almost every description of glazing, where Plate-Glass is not introduced. The qualities of this glass are con-

spicuous to persons accustomed to examine the goodness of materials, and, in many instances, must be apparent to the common observer. The best description is recognized for its clearness as well as richness, and it is also free from the peculiar redness adverted to, which approximates to the colour of scarlet water, made by lake, and which, on being mixed or diluted in clear cold spring water, resembles the blushing faded rose. The value of British Plate-Glass, cast to the sizes ordered, increases very rapidly, and in arithmetical proportions with their sizes, according to fractional parts, which has rendered it necessary for the manufacturers to publish a regular tariff, or book of prices, to which our friends are referred, as well as to the agent of the British Plate-Glass Company, on the Surrey side of Blackfriars' Bridge, London, where every information upon the subject of Plate-Glass may be speedily acquired. Value of British Plate-glass.

Squares or panes of Plate-Glass, containing from three to four superficial feet, are worth from 16*s.* to 18*s.*; from two to three feet, are equal in worth to 14*s.* or 16*s.*; and from one to two feet are equal in worth to 12*s.* or 14*s.* or thereabouts. Value of Plate-glass, according to sizes.

German Plate-Glass is nearly of the same quality as the best Newcastle; and in cases where the squares or panes of glass cannot be obtained out of the tables, the latter, German-Plate, is invariably introduced, it being manufactured upon such principles as to obtain squares of larger dimensions; consequently, the prices for it are regulated accordingly. Qualities of German Plate-glass.

As to Moulded or Waved-Glass, it is not, at present, much in use; but where strength is required, it is far superior to Ground-Glass, and answers the same purpose, by admitting the light, and, at the same time, rendering the apartments extremely private and serene. Moulded or Waved-glass.

Stained glass, within the last forty years, has increased in reputation; and, notwithstanding the prejudice entertained against our modern artists, it is confidently asserted, that the pages of history cannot boast of works in Stained-Glass superior to those executed under the auspices of our late revered Sovereign, George the Third, who, during his reign, caused the Fine Arts to be raised to an elevation unknown in the annals of British History. Stained glass is sold by weight, proportioned to the colours of *Red, Blue, Yellow,* or *Claude Lorraine;* but where historical subjects are introduced, as in the windows of our churches and chapels, they are valued in proportion to their merit, by artists duly qualified. Mr. BACKLER, of Newman Street, London, ranks very high in this department of the art. Use of Stained-glass: patronized by Geo. III.

AVERAGE PRICES OF GLAZIERS' WORKS,

IN ENGLAND, IRELAND, AND SCOTLAND.

	s.	d.	
THE best Newcastle Crown-glass, in squares, from 3 feet super and upwards	3	8	Best Newcastle-glass.
Do. from 3 feet to 2 ft. 6 in.	3	4	
Do. from 2 ft. 6 in. to 2 feet	3	2	

		s.	d.
	The best Newcastle Crown-glass, in squares, under 2 feet	3	0
Second best.	The second best Newcastle Crown-glass, from 3 feet super. and upwards	3	2
	Do. from 3 feet to 2 feet 6 in.	3	0
	Do. from 2 ft. 6 in. to 2 feet	2	9
	Do. under 2 feet	2	6
Third best.	The third best Newcastle Crown-glass, from 3 feet super. and upwards	2	8
	Do. from 3 feet to 2 feet 6 in., do.	2	6
	Do. from 2 ft. 6 to 2 feet, do.	2	4
	Do. under 2 feet, do.	2	2
Best Newcastle glass in old sashes.	Best Newcastle Crown-glass, stopped, in old sashes, at per foot super, under 3 feet	4	0
	Do. from 3 feet to 2 ft. 6 in., do.	3	8
	Do. from 2 ft. 6 in. to 2 ft., do.	3	4
	Do. under 2 feet, do.	3	0
Green Newcastle-glass.	Green Newcastle-glass, per foot super	1	8
	Do. in old sashes, do.	2	0
Ground-glass.	Ground-glass, from 3 feet to 2 ft. 6 in., per foot super	5	3
	Do. from 2 ft. 6 in. to 2 feet, do.	4	10
	Do. 2 feet square, do.	4	5
	Waved-glass, do.	4	0
Lead-lights.	In quarries, per foot super, with the best glass	1	6
	Do. in quarries, under 8 in. by 6 in.	1	4
	Green Newcastle squares, under 7 in. by 5 in., old lights, each	0	3
	Do. 7 in. by 5 in. up to 8 in. by 6 in., do.	0	5
	Do. above 8 in. by 6 in. up to 9 in. by 7 in., do.	0	7
	Do. above 9 in. by 7 in. up to 10 in. by $8\frac{1}{2}$ in., do.	0	9
Lead-work.	New leading old lights, per foot super	0	8
	Repairing and part leading, do.	0	5
	Repairing only, do.	0	3
Cement, pinning, &c.	Cementing sky-lights, do.	0	$3\frac{1}{2}$
	Repairing do. only, do.	0	$1\frac{1}{2}$
	Pining casements, each	0	9
	Puttying windows or skylights, on both sides, per dozen squares	1	0
	Do. on one side only	0	6
Window cleaning.	Cleaning 12-squared windows of all sizes, on the average, and in proportion to the number of squares, each	0	8
	Do. Wyatt or Venetian, do.	1	2
	Do. ordinary sized lead lights, do.	0	4
Day-work.	Glazier, per day, in London	5	6
	Putty, per pound	0	5

Prime cost of Newcastle-glass. The average prime cost of the best Newcastle crown window-glass, in crates, each containing 12 tables, is from 10 guineas up to £10. 15*s.* and £11.

Prime cost of the second best do., each containing 15 tables, from £11. up to £12.

Prime cost of the third best do., each containing 18 tables, from 11 guineas up to £12.

Prime cost of green glass, each containing also 18 tables, from £10. up to 10 guineas.

The best stained glass is worth from 6*s.* to 7*s.*, 8*s.*, and 9*s.* per pound; and the blue colour, we believe, is the dearest. The *Claude Lorraine* stained glass is of an orange or lemon colour, and is named after the celebrated landscape-painter of that name, whose skies are remarkable, from being uniformly painted of a warm yellow teint, approximating the hue of the sky at sun-set or sun-rise. Price of Stained-glass.

CHAPTER IX.

On Smiths' Work.

Iron, which is the most useful metal that has been discovered, cannot be too highly estimated, and, as far as regards its general utility, too much cannot be said in praise of it. The Swedish iron is preferable to the English for some purposes; and the smiths, who are in general intelligent men, account for it by proving, that the grain of the metal is more pure, and less liable to be broken. Its qualities may be ascertained by comparison: for example, let a bar of Swedish and one of English iron be severed, at the same time, asunder. and by comparing the grain of each metal, it will be presently seen whether the Swedish or English iron be of a superior quality; the grain of the former is generally *fine* and *silvery*, but that of the latter comparatively *coarse*, and evidently not possessing the same genuine properties. English iron is, nevertheless, a metal which will ever be considered very valuable, inasmuch as it answers every purpose that can be required; but for ornamental iron-work the Swedish metal is, by scientific men, preferred, inasmuch as it is tougher and more pliable to the fancy of the ornamental smith, who, for certain kinds of work performed with it, claims a high price per pound. To prove the qualities of Swedish and English iron. Swedish iron preferred for ornamental work.

A cubic inch of Swedish iron weighs exactly four ounces; a cubic inch of English iron rather less, an evident proof of a difference in the specific qualities.

Cast-iron is now used for all manner of purposes about building, and claims particular attention. The prices per hundred weight differ according to the patterns of the casting, as well as the thickness of the several articles, which are formed with the metal. Value of cast-iron.

Smith's work is charged by the pound, or the hundred weight of 112 pounds; and the value of it is regulated, in a great measure, by the market price of English and Swedish bar and pig-iron per ton. The prices of coals will also serve to enhance the value of wrought and cast iron: in some parts of the kingdom coals are very scarce, and consequently iron-work in those parts must be proportionately dear. Iron regulated by the market-price.

AVERAGE PRICES OF IRON-WORK,

IN ENGLAND, IRELAND, AND SCOTLAND.

			s.	d.
Palisadoes.	WROUGHT iron palisadoes, chimney-bars, and other large hammered work of English iron, at per pound		0	$5\frac{1}{2}$
	Smaller hammered work, made of Swedish iron, do		0	8
Iron doors.	English wrought-iron doors, similar to those described in the Act of Parliament, for dividing warehouses, &c. do		0	10
Shutters, &c.	Do. window-shutter bars, do		0	10
	Do. ash-grates, casements, cross window, and saddle bars, do		0	$8\frac{1}{2}$
	Do. cramps, holdfasts, dogs, gudgeons, hoops, and pump-work, do		0	6
	Do. nuts and screw-bolts, do		0	8
Casements, stay-bars, &c.	Do. wrought-iron casements to windows, with stays to the same, saddle-bars, pins, hooks, and street-door chains, &c.		0	$8\frac{1}{2}$
Ornamental work in Swedish iron.	Ornamental iron-work to stairs, scrolls, gates, lamp-irons, brackets, &c. made with Swedish iron, according to the ingenuity of workmanship, from 10*d.* per pound, to 12*d.*, 14*d.*, 16*d.*, 18*d.*, and		1	8
Cast-iron in bars, &c.	Cast-iron bars to prison windows, cast-iron railings, sash-weights, and similar sorts of cast-iron work, per cwt.		14	0
Columns, &c.	Cast-iron columns, of various descriptions, per hundred weight, from 15*s.*, 16*s.*, 17*s.*, 18*s.*, 19*s.*, and	1	0	0

Nails, &c. — For the prices of nails, screws, hinges, locks, &c. refer to the Master-Carpenters' and Joiners' Prices for Day-work, in pages 48-51.

One foot run of bar-iron, one inch square, weighs about $3\frac{1}{2}$ pounds.

Do. two inches square, about 14 pounds.

Do. three inches square, about $31\frac{1}{2}$ pounds.

Market price. — English iron, £13. per ton; Swedish do. £19. per ton, prime cost.

ON COPPERSMITHS' WORK, IN LONDON, &c.

On the value of copper. *Bath and Portland stone.*

COPPER is a very neat light covering upon inclined planes; and, considering at all times its intrinsic worth, cannot be considered as a dear article for sheathing. It is an excellent substitute for lead in particular places, and most desirable upon spires of churches, cupolas, turrets, and similar structures, where the wet is not likely to corrode the metal: it is very durable, and when painted and judiciously sanded, to imitate Portland, Bath, or any other sort of free-stone, it presents a very pleasing effect. The quantities and value is ascertained by measuring the superficial contents in feet and inches, in which measurements must be included all manner of laps.

Average Prices of Coppersmiths' Works.

	s.	d.	
If the weight of the copper in sheets is 12 ounces to the pound, per foot super	1	7	Value of copper by the weight, &c.
If 14 ounces, do.	1	10	
If 16 ounces, do.	2	0	
Sheets of copper, 52 inches by 26 inches, weigh eight pounds, or thereabouts, 1*s.* 2*d.* per lb. prime cost.			Sizes of sheets of copper, 52 inch. by 26 in.
Copper-pipes, $2\frac{1}{4}$ inches bore, per foot run	1	5	Pipes, sizes, &c.
Do. 3-in. bore, do.	1	10	
Do. $3\frac{1}{2}$-in. bore, do.	2	2	
Do. 4-in. bore, do.	2	5	
Copper-tinned coverings, 20 ounces to the superficial square foot	3	0	Tinned copper, sizes, &c.
Do. 18-in. do	2	9	
Do. 16-in. do	2	8	
Sheet brass, from £.160 to £.165 per cwt.			

Wire-Workers' average Prices, for such Works as are used in Buildings, in London, &c.

Strong iron wire-work to inclose safes, pantries, larders, &c., at per foot superficial, from 1*s.* 10*d.* to 2*s.*, 2*s.* 2*d.*, 2*s.* 4*d.*, and 2*s.* 6*d.* Iron-wire safes, pantries, and larders.

Copper do. from 3*s.* 9*d.* to 4*s.*, 4*s.* 3*d.*, and 4*s.* 6*d.* per foot super. Copper-wire.

Brass do. of various patterns, from 3*s.* 6*d.* to 4*s.*, 4*s.* 6*d.*, and 5*s.* per foot super, used in book-cases, boudoirs, and all manner of fancy-rooms. Brass do. Bookcases, &c.

On Paper-Hangers' Work, in London, &c.

Prices of paper various.

The prices, per yard, for paper, are various, from 4*d.* to 5*d.*, 6*d.*, 7*d.*, 8*d.*, 9*d.*, 10*d.*, 11*d.*, and 12*d.*, up to 5*s.* and more; and the bordering in the same ratio. Paper for hanging rooms is only 20 inches wide; consequently, 3 feet or 36 inches is equal to a yard, lineal measure, multiplied by 20, is equal to 720 inches, which is a yard super of paper, equal to 5 feet, superficial measure: if any number of superficial feet is multiplied by 5, it will produce the number of superficial yards of paper there is in a room, passage, or staircase. Bordering to papered rooms must be measured in the same way, with reference to their widths. The price for hanging paper, including all expenses, is 1*s.* 6*d.* per piece for 12 yards, running measure; that is, 20 inches wide: and for flock-papers, after the rate of 3*s.* 6*d.* per piece, and the bordering in the same proportion.

Five feet one yard of paper-hanging.

THE END OF THE PRICE-BOOK.

ADDITIONAL PLATES GIVEN IN THIS WORK.

AS Frontispiece to the "BUILDER'S PRICE-BOOK" is given the plan and elevation of a castellated Villa, drawn by Mr. MICHAEL ANGELO NICHOLSON, from a design by Mr. ELSAM, who, in the course of this Work, has taken every occasion to elucidate the prices of all such works as are performed in similar or other buildings.

The plan and elevation above adverted to, was prepared, in the year 1808, for Mr. ALDERMAN JOHN CLAUDIUS BERESFORD, of Dublin, and of Learmont, in the county of Derry, in the North of Ireland. The Plan, which is considered *nouvelle*, was formed to suit some delightful romantic views, and, at the same time, to unite with part of an old favourite cottage, which is appropriated to the butler's-room and servants'-hall; the *rere* of which consists of a kitchen, housekeeper's-room, a series of servants' bed-chambers, &c. The principal front, as represented, is three stories high. The ground story comprises three handsome apartments, *en suite*, consisting of dining-room, library, and drawing-room, connected with a vestibule at the entrance, and a conservatory at the extremity. There is likewise provided a handsome geometrical staircase, connecting the old and new parts. The basement story comprises a magisterial-room and clerk's-office, with a few select apartments for children, nurses, governesses, &c.; and the one-pair floor comprises three capital bed-chambers, with dressing-rooms, &c., making altogether a gentleman's elegant compact country residence, upon a moderate scale.

The second Plate serves to explain the prices upon the sawing and land-carriage of 10-feet deals, and which should be placed opposite page 88; it illustrates, in the clearest manner, the ratios of charges which are incorporated in the prices of deals.

The plate comprising *Elevations of three First-rate Houses, in reference to the Building-Act,* is intended to illustrate the description of houses which are referred to; and, in order to convey to those who are not particularly conversant in designing clusters of such buildings, we have given a few specimens of plain elevations: and, in pursuance of such intentions, the Building-Act is further illustrated by the plate comprising *Elevations of a series of First and Second-rate Houses, in reference to the Building-Act,* consisting of four first-rate houses and two second-rate houses: and the said Act is also further elucidated by the plate which exhibits *Elevations of four Third-rate Houses,* being the front of Cardigan Place, Kennington-Cross, near London, built for Thomas Evans, Esq., in 1806; and by an *Elevation of a Third and two Fourth-rate Houses,* represented in the same plate, and built in the same year, by Mr. ELSAM, on the estate of Sir Robert Clayton, Bart., and known as the Villa-House, or Buildings, near Vauxhall, in the county of Surrey.

The three last-mentioned Plates of Rates of Houses to be placed opposite this page.

The plates representing the Sections of Party and External Walls to *first, second, third,* and *fourth-rate* buildings, with the plans of chimnies, &c., are comprised in three intelligent plates, already given in the Practical Builder, and numbered LXXXVII, LXXXVIII, LXXXIX, which fully explain the true intent and meaning of the Act of Parliament, as regards the thicknesses of party and external walls; the further particulars of which will be found minutely explained in our copious Abstract of the Building-Act.

ELEVATIONS OF THREE FIRST RATE HOUSES,

in Reference to the Building Act

London Published by Thos Kelly

ELEVATIONS OF A SERIES OF FIRST AND SECOND RATE HOUSES,

in Reference to the 'Building' Act

Thos Kelly 17 Paternoster Row, June 25 1825

ELEVATIONS OF THIRD RATE HOUSES,

in Reference to the Building Act

ELEVATIONS OF THIRD AND FOURTH RATE HOUSES,

in Reference to the Building Act

A COPIOUS ABSTRACT

OF

THE BUILDING ACT,

For the better Regulation of Buildings, and for the more effectually preventing Mischiefs by Fire, within the Cities of London and Westminster,—the Weekly Bills of Mortality,—the Parishes of St. Mary-la-Bonne, Paddington, St. Pancras, and St. Luke's, Chelsea.

Date of the Act, 1774. **Prefatory observations to the abstract of Building Act.**

THIS Act was passed in the 14th of Geo. III., in the year 1774, and reduces into one, all former acts relative to Building, within the places specified. It therefore can only be recognized as a local act, or be judicially taken notice of as respects the interests of the cities of London, Westminster, and the borough of Southwark, &c.; but with respect to the salutary principles and regulations contained in the said act, we may venture to state, without the fear of being contradicted by any, except the *prejudiced*, that the Building Act is not only worthy of being adopted in every great city and town throughout the empire, but that it is likewise a fit and proper subject for the study and consideration of every master-builder, workman, or other person who is, or may hereafter be, concerned in building, in any part of the King's dominions, or elsewhere.

Sir Robert Taylor, the author of the Building Act. **Michael Angelo Taylor, Esq. M.P.**

The act now under consideration, we are confidently informed, was prepared by the late Sir Robert Taylor, who, during his time, was architect of the Bank of England, and was considered a gentleman of great talent; and although many of his works, in the building alluded to, have been recently removed, yet we are not prepared to say how far, in point of taste, the subsequent much-admired alterations, opposite the Bank-buildings, are for the best, but shall contend, at any rate, that the public is indebted to Sir Robert Taylor for the Building act; and to his son, Mr. Michael Angelo Taylor, M.P. for the new Paving act, both of which, in our opinion, are entitled to the highest consideration in the mind of every British subject who is disposed to set a proper value upon what is wisely carried into effect by the Legislature, for the general benefit of this great and thriving city.

Complaint against the act not well founded. **Act in force 50 years.**

The building act is complained of as being extremely *verbose*, and so are most Acts of Parliament, but this does not lessen their value: it is true, that in the act now before us, there appears some inconsistencies as to the mode of ascertaining the rates of buildings; but, as regards the interest of the public, it has been wisely provided for by the discretionary power vested in the good sense of the magistrates and intelligent district-surveyors. The act has now been in force upwards of fifty years, during which period one-fourth of London has been built, and numberless fires prevented by the improved mode of building stipulated for in the act; with all its faults, therefore, we hope it will remain in *statu quo*, subject to the good sense of district-surveyors, who are under the controul of the Magistrates for the Counties of Middlesex and Surrey, together with the Lord Mayor and the Aldermen of the City of London.

BY THIS ACT, BUILDINGS ARE DIVIDED INTO SEVEN RATES, OR CLASSES, AS FOLLOWS:

First-rate buildings. Churches, chapels, distilleries, &c.

In reference to the first-rate buildings, *it is enacted*, "That every church, chapel, meeting-house, and other place of public worship, and every house or building for distilling and brewing of liquor for sale; for making of soap, for melting of tallow, for dying, for boiling, or distilling turpentine, for casting

Chemists, sugar-refiners, warehouses, &c. &c. Fifth, sixth, and seventh, rates, 31 feet high above pavement.

brass or iron, for refining of sugar, for making of glass for chemical works for sale, of what dimension soever the same respectively are or may be; and also every warehouse and other building whatsoever, not being a dwelling-house, now built or hereafter to be built, (except such buildings as are herein particularly declared to be of the *fifth, sixth, or seventh,* rate or class of buildings,) which does, or shall exceed, three clear stories above ground, exclusive of the rooms (if any) in the roofs, or which is or shall be of the height of thirty-one feet from the surface of the pavement-ground, or way, above the area before either of the fronts to the top of the blocking-course, or the coping on the parapet; and every dwelling-house, now built, or hereafter to be built, which, with the offices belonging and adjoining, or connected, otherwise than by a fence or fence-wall, or covered passage, open on one or both sides when finished, does or shall exceed the value of £850.; and also every dwelling-house which does or shall exceed nine squares of building on the ground-floor, each square, containing 100 superficial feet, shall be deemed the *first-rate,* or class of building, and must be built in the subsequent manner."

Thickness of external walls to the first-rate, $2\frac{1}{2}$ bricks at foundations, or 1 ft. $9\frac{1}{2}$ in.

And it is also enacted, "That every front, side, end, or other EXTERNAL wall, not being a *party-wall,* which shall be built, to any *first-rate* building, or to any addition thereto, or enlargement thereof, shall be built, at the foundation, of the thickness of $2\frac{1}{2}$ bricks in length, or 1 ft. $9\frac{1}{2}$ in. at the least, and shall from thence gradually diminish, on each side of the wall, $2\frac{1}{4}$ inches to the top of the footing, which shall be 9 inches high at the least, and wholly below the upper surface of the pavement or flooring-boards of the cellar-story two inches at the least, and every such wall shall, from the top of such footing, be of the thickness of two bricks in length, or 1 ft. $5\frac{1}{2}$ in. at the least, up to the under side of the plate, under the roof or gutter of every such building, and from thence of the thickness of one brick in length, or $8\frac{1}{2}$ inches, at the least, up to the under side of the blocking-course, or coping, on the parapet, except such parts of every such wall, as shall be wholly of stone, which parts being of stone, shall be of the thickness of 14 inches at the least, below the ground-floor, and of 9 inches at the least above the ground-floor, and except all recesses above the ground-floor in the said walls, which shall be arched over in every story, so that the arch, at the back of such recess, shall be respectively of the thickness of one brick in length, or $8\frac{1}{2}$ inches, at the least."—*(Vide the Plate.)*

Thickness of party-walls to first-rate buildings, $3\frac{1}{2}$ bricks, or 2 ft. $6\frac{1}{2}$ in. foundations.

And it is also enacted, "That every *party-wall* to any first-rate building, addition, or enlargement, shall be built, at the foundation, of the thickness of $3\frac{1}{2}$ bricks in length, or 2 ft. $6\frac{1}{2}$ in. at the least, and shall from thence gradually diminish on each side of the wall $4\frac{1}{2}$ in. to the top of the footing, which shall be one foot high, at the least, and wholly below the upper surface of the pavement and flooring-boards of the cellar-story, two inches at the least; and every such party-wall shall, from the top of such footing, be of the thickness of $2\frac{1}{2}$ bricks in length, or 1 ft. $9\frac{1}{2}$ in. at the least, up to the under side of the ground-floor; and from thence of the thickness of two bricks in length, or 1 ft. $5\frac{1}{2}$ in. at the least, up to the under side of the floor of the rooms (if any) in the roof of the highest building adjoining to such party-wall; and from thence of the thickness of $1\frac{1}{2}$ brick in length, or 13 inches, at the least, up to the top of every such party-wall, being the height of 18 inches, in every part above the square of the rafter of the highest building adjoining, and one foot above the gutters."

Vide the plates of party-walls, &c.

For the further elucidation of the thicknesses of external and party-walls, &c., the reader is requested to refer to the engraved plates, already given in '*The Practical Builder,*' before and subsequently alluded to.

Second-rate buildings.

And it is also enacted, "That every warehouse, stable, and other building, not being a dwelling-house, except such buildings as are herein particularly declared to be of the first, fifth, sixth, or seventh, rate or class of building, now built or hereafter to be built, which does or shall exceed two clear stories, and shall not contain more than three clear stories, above ground, exclusive of the rooms (if any) in the roof, or which is, or shall be, of the height of 22 feet, and

shall not be of the height of 31 feet, from the surface of the pavement, above the area before either of the fronts, to the top of the blocking-course or coping on the parapet; and every dwelling-house, now built, or hereafter to be built, which, with the offices belonging and adjoining, or connected otherwise than by a fence or fence-wall, or covered passage, open on one or both sides when finished, does or shall exceed the value of £300., and shall not amount to more than £850.; and also every dwelling-house, which does or shall exceed five squares of building on the ground plan, and shall not amount to more than nine squares of building on the ground plan, shall be deemed the *second-rate* of building, and must be built in the subsequent manner."

Thickness of external walls to second-rate buildings, 2 bricks, or 1 ft. $5\frac{1}{2}$ in.

And it is also enacted, "That every front, side, or other *external* wall, (not being a party-wall,) which shall be built to any second-rate building, or to any addition or enlargement, shall be built, at the foundation, of the thickness of two bricks in length, or 1 ft. $5\frac{1}{2}$ in. at the least, and shall from thence gradually diminish on each side of the wall $2\frac{1}{4}$ inches to the top of the footing, except where any immediate adjoining building will not admit of such footing, in which case such footing shall be made as near to the dimensions directed as possible, and which footing shall be 9 inches high, at the least, and wholly below the upper surface of the pavement, or flooring-boards of the cellar-story, 2 inches at the least; and every such wall shall, from the top of such footing, be of the thickness of $1\frac{1}{2}$ brick, or 13 inches at the least, up to the under side of the one-pair floor, and from thence of the thickness of one brick in length, or $8\frac{1}{2}$ inches at the least, up to to the under side of the blocking-course, or the coping on the parapet of every such second-rate, except such parts of walls, being above the ground-floor, as shall be wholly of stone, which parts of stone shall be of the thickness of 9 inches at the least, and except all recesses above the ground-floor in the said walls, which shall be arched over, so that the arches and the backs of the recesses shall respectively be of the thickness of one brick, in length, or $8\frac{1}{2}$ inches at the least."—*(Vide the Plate.)*

Thickness of party-walls to second-rate buildings, $3\frac{1}{2}$ bricks, or 2ft. $6\frac{1}{2}$ in.

And it is also enacted, "That every *party-wall,* which shall be built to any second-rate building, or to any addition or enlargement, shall be built, at the foundation, of the thickness of $3\frac{1}{2}$ bricks, or 2 ft. $6\frac{1}{2}$ in. at the least, and shall from thence gradually diminish on each side of the wall $4\frac{1}{2}$ inches to the top of the footing of every such wall, which footing shall be 9 inches high, at the least, and wholly below the upper surface of the pavement, or flooring-boards of the cellar story, 2 inches at the least; and every such party-wall shall, from the top of such footing, be of the thickness of $2\frac{1}{2}$ bricks in length, or 1 ft. $9\frac{1}{2}$ in. at the least, up to the under side of the ground-floor, and from thence of the thickness of two bricks in length, or 1 ft. $5\frac{1}{2}$ in. at the least, up to the under side of the floor of the two-pair; and from thence of the thickness of $1\frac{1}{2}$ brick in length, or 13 inches at the least, up to the top of every party-wall, being of the height of 18 inches in every part above the square of the rafters of the highest building adjoining, and one foot above the gutters."—*(Vide the Plate.)*

Third-rate of buildings.

And it is also enacted, "That every warehouse, stable, and other building, not being a dwelling-house, except such buildings as are herein particularly declared to be of the *first, fifth, sixth,* or *seventh,* rates of building, now built or hereafter to be built, which does or shall exceed one clear story, and shall not contain more than two clear stories above ground, exclusive of the rooms (if any) in the roof, or which is, or shall be, of the height of more than 13 feet, and shall not be of the height of 22 feet, from the surface of the pavement above the area before either of the fronts, to the top of the blocking-course, or the coping on the parapet; and every dwelling-house now built, or hereafter to be built, which, with the offices belonging and adjoining, or connected otherwise than by a fence or fence-wall, or covered passage, open on one side or both sides, when finished, does or shall exceed the value of £150., and shall not amount to more than £300.; and also every dwelling-house, which does or shall exceed $3\frac{1}{2}$ squares of building on the ground plan, and shall not amount to more than five

squares on the ground plan, shall be deemed the *third-rate* of building, and must be built in the subsequent manner."

Thickness of external walls to the third-rate buildings, 2 bricks, or 1 ft. 5½ in.

And it is also enacted, "That every front, side, end, or other *external* wall, (not being a *party-wall*,) which shall be built to any third-rate building, or to any addition or enlargement, shall be built, at the foundation, of the thickness of two bricks in length, or 1 ft. 5½ in. at the least, and shall from thence gradually diminish on each side of the wall, except where any immediate adjoining buildings will not admit of such footing being made on the side of such wall, in which case, such footings shall be made as near to the dimensions herein directed as possible, and which footings shall be six inches high, at the least, and wholly below the upper surface of the pavement, or flooring-boards of the cellar story, two inches at the least; and every such wall shall, from the top of such footing, be of the thickness of one brick in length, or 8½ inches, at the least, up to the under side of the blocking-course, or the parapet, of every *third-rate* building."

Thickness of party-walls to third-rate buildings, 3 bricks, or 2 ft. 2 in.

And it is also enacted, "That every *party-wall* which shall be built to any third-rate building, or to any addition or enlargement, shall be built, at the foundation, of the thickness of three bricks in length, or 2 ft. 2 in. at the least, and shall from thence gradually diminish, on each side of the wall, 4½ inches, to the top of the footing of every such wall, which footing shall be 9 inches high, at the least, and wholly below the upper surface of the pavement or flooring-boards of the cellar story, 2 inches at the least; and every such party-wall shall, from the top of such footing, be of the thickness of two bricks in length, or 1 foot 5½ inches, at the least, up to the under side of the ground-floor; and from thence of the thickness of 1½ brick in length, or 13 inches, at the least, up to the top of every such party-wall, being the height of 18 inches, in every part above the square of the rafters of the highest building adjoining, and one foot above the gutters."—(*Vide the Plate.*)

Fourth-rate buildings.

And it is also enacted, "That every warehouse, stable, and other building, not being a dwelling-house, except such buildings as are herein particularly declared to be of the first, fifth, sixth, or seventh, rates of building, now built or hereafter to be built, which does not, or shall not, exceed one clear story above ground, exclusive of the rooms (if any) in the roof, or which is not, or shall not be, of the height of more than 13 feet, from the surface of the pavement above the area before either of the fronts, to the top of the blocking-course, or coping, on the parapet; and every dwelling-house now built, or hereafter to be built, which, with the offices belonging and adjoining, or connected otherwise than by a fence, or a party fence-wall, or covered passage, open on one or both sides, when finished, does not, nor shall not, exceed the value of £150.; and also every dwelling-house, which does not, or shall not, exceed 3½ squares of building, on the ground plan thereof, shall be deemed to be of the *fourth-rate* of building, and must be built in the subsequent manner."

Thickness of external walls to fourth-rate buildings, 2 bricks, or 1 ft. 5½ in.

And it is also enacted, "That every front, side, end, or *external wall*, which shall be built to any fourth-rate building, or to any addition or enlargement, shall be built, at the foundation, of the thickness of two bricks in length, or 1 ft. 5½ in. at the least, and shall from thence gradually diminish, on each side of the wall, 2¼ inches, to the top of the footing, except where any immediate adjoining building will not admit of such footing; in which case, such footing shall be made as near the dimensions herein directed as possible, and which footing shall be six inches high, at the least, and wholly below the upper surface of the pavement, or flooring-boards, of the cellar story, two inches, at the least, and every such wall shall, from the top of such footing, be of the thickness of 1½ brick, in length, or 13 inches, at the least, up to the under side of the ground-floor; and from thence of the thickness of one brick in length, or 8½ inches, at the least, up to the under side of the blocking-course, or coping, on the parapet, of every *fourth-rate* building."

Thickness of party-walls, &c.

And it is also enacted, "That every *party-wall*, which shall be built to any fourth-rate building, or to any addition or enlargement, shall be built, at the

foundation, of the thickness of two bricks, in length, or 1 ft. $5\frac{1}{2}$ in. at the least; and shall from thence gradually diminish, on each side of the wall, $2\frac{1}{4}$ inches, to the top of the footing, which shall be 9 inches high, at the least, and wholly below the upper surface of the pavement or flooring-boards of the cellar story, 2 inches, at the least; and every such party-wall shall, from the top of such footing, be of the thickness of $1\frac{1}{2}$ brick, in length, or 13 inches, at the least, up to the under side of the ground-floor, and from thence of the thickness of one brick, in length, or $8\frac{1}{2}$ inches, at the least, up to the top of such party-wall, being the height of 18 inches, in every part above the square of the rafters or the highest building adjoining, and one foot above the gutters."—*(Vide the Plate.)* Thickness of party-walls to fourth-rate buildings.

And it is also enacted, "That every dwelling-house, warehouse, stable, or other building, except such buildings not being dwelling-houses, as are herein before particularly declared to be of the *first* or *seventh* rate of building, which is, or shall be, at the distance of 4 feet, and not 8 feet, from any public road, street, or causeway, and is or shall be detached from any other building not in same possession therewith, 16 feet, at the least, and not 30 feet, or connected with any other building only by a fence, or fence-wall, shall be deemed of the *fifth-rate* of building, and shall and may be built of any dimensions whatever." Description of fifth-rate buildings.

And it is also enacted, "That every dwelling-house, warehouse, stable, and other building, &c. except such buildings not being dwelling-houses, as are herein-before particularly declared to be of the first-rate of building, which is or shall be at the distance of eight feet from any public road, street, or causeway, and is or shall be detached from any other building, not in the same possession, at least thirty feet, or connected with any other building only by a fence or fence-wall, shall be deemed to be of the sixth-rate of building, and shall and may be built of any dimensions, and with any materials whatever." Of sixth-rate buildings.

And it is also enacted, "That every crane-house now built, or hereafter to be built, on any wharf or quay, and every shamble, wind-mill, or water-mill, and also every building which is or shall be situated without the Cities of *London* and *Westminster* and the Liberties thereof, used for workshops, or drying places for Tanners, Fellmongers, Glue-makers, Size-makers, Calico-printers, Whisters, Whiting-makers, Curriers, Leather-dressers, Buckram-stiffeners, Oil-cloth painters, Wool-staplers, Throwsters, Parchment-makers, and Paper-makers, so long and at such times as they are or shall be used for some or one of those purposes and no longer, shall be deemed the seventh-rate of building, and may be built of any dimensions whatever." Of seventh-rate buildings.

And it is also enacted, "That after the 24th of June, 1774, no crane-house or other building of the seventh-rate of building or any external part thereof, shall be covered with pitch, tar, or any other inflammable composition or material whatever, nor shall be converted to any use than as aforesaid." Pitch, &c. not to be used on crane-houses.

And it is also enacted, "That crane-houses shall be built, together with additions or enlargements, either with stone, brick, slate, tile, oak, elm, steel, iron, or brass; but every other building of the seventh-rate may be erected of any materials whatever." Materials of crane-houses.

Detached offices are deemed of the same rate, as if independent of any other building, only being connected by a fence or fence-wall, or covered passage, open on one or both sides. Detached offices.

Party-walls to be between house and house, and other buildings, except in such parts where each have independent walls. Party-walls to houses

All party-walls above four stories high to be built as of the first-rate.

Party-walls to fourth-rate houses, being four stories high, to be built as of the third-rate.

And it is also enacted, "That every internal inclosure to be made for separating any building of the first, second, third, or fourth, rate or class of building from any other building where such buildings shall be in separate occupations, and every addition or enlargement to such internal inclosures shall be of brick or stone, or artificial stone or stucco, or of brick and stone or artificial stone or Materials in divisions of different occupations.

stucco together, except such timber, wood, lead, or iron-work, as may be laid therein, according to the directions contained in the act for external enclosures, except such piling, bridging, or planking as may be necessary for the foundations of the same."

Method of ascertaining the rates.

And it is also enacted, "That in valueing the several buildings before-mentioned, for the purposes of ascertaining the rates, such valuations shall be made by the district-surveyors, by as true measures and estimations as the nature of the cases will admit of."

Squares; how to be taken.

And it is also enacted, "That in ascertaining the squares of buildings contained in dwelling-houses, or otherwise, that the same shall be taken by the district-surveyors, on the level of the floors at the principal entrances of such dwelling-houses, and no more than such parts of the party-walls as belong to such dwelling-houses shall be included in such admeasurements; and in case the owner or builder should apprehend him or herself injured by the admeasurements or valuations of the district-surveyors, it will then be lawful for such persons to apply to the Lord-Mayor, or to any two Justices of the Peace for redress, in whose jurisdiction the same may happen to be, and ultimately the parties aggrieved may appeal to the Justices of the Peace at their General Quarter Sessions."

Persons seeking redress to apply to the Lord-Mayor, &c.

Thickness of party-walls.

Party-walls not being of sufficient thickness, must be taken down when one or more of the adjoining houses require to be re-built.

Old timbers.

Ends of timbers lying through old party-walls to be cut off when new buildings are erected against them.

Scite of ground, &c.

The old materials in old party-walls the joint property of the parties, and half the scite of the old party-wall, when pulled down.

On external walls.

External walls cannot become party-walls, unless the same have been previously erected to correspond with the stipulations respecting the several thicknesses and heights of party-walls.

Height of party-walls.

Party-walls must be one foot six inches above any building which shall gable against them, measuring at right angles with the backs of the rafters.

Recesses.

Recesses must not be made in any party-walls of the *first, second, third,* or *fourth,* rate buildings, except for chimnies, flues, girders, and beams, and other timbers, and for the ends of walls or piers, so as to reduce such walls in parts under the thicknesses required by the Act.

Openings in party-walls.

Openings must not be made in party-walls except for communications from one stack of warehouses to another, and from one stable building to another, all which communications must be fitted with iron-doors, except such passages or ways on the ground for foot-passengers, cattle, or carriages; all which passages must be arched over with brick or stone throughout, of the thickness of 13½ inches at the least, in every building of the third or fourth rate; and if there be any cellars or vacuities under such passages, they must also be arched over in like manner.

Timbers in party-walls.

Timbers must not be laid into party-arches, except for bond; nor to any party-wall, other than templets, chains, and bond-timbers, which may be necessary, and other than the ends of girders, beams, purlines, or of binding or trimming-joists, or of other principal timbers; all which timbers must have at least 8½ inches of solid brick-work between the ends and sides of every such pieces of timber.

Party-walls must not be maimed.

Party-arches and party-walls must not be maimed, nor the shafts of any chimney, except for the purposes of inserting the ends of new front walls, or those in the rere, &c.

Where party-walls may be cut.

Where the fronts of buildings are in a line with each other a break may be cut, either in the fore or back-front, or in both, for the purpose of inserting the end of any new external wall of an intended adjoining building; but such break must not be made more than nine inches deep from the outward faces of the external walls, nor beyond the centre of the party-wall belonging to them.

Story-posts.

For the convenience of inserting bressumers and story-posts to be fixed on the ground-floor, either in the front or back-wall, a recess may be cut from the

foundation of the new wall to the height of the bressummer, fourteen inches deep from the outward face of such wall, and four inches wide in the cellar story, and 2 inches wide in the ground-story.

Stone steps.

Incisions may also be cut in party-walls for the tailing-in of stone-steps or stone-landings, or for bearers to wood-stairs, or for laying in stone corbels for supporting of chimney-jambs, girders, beams, purlines, binding or trimming-joists, or other principal timbers.

Incisions in party-walls.

In party-walls, not less than thirteen inches thick, perpendicular recesses may be cut for inserting walls or piers, but the cuts must not be more than fifteen inches in width, nor more than four inches deep; and where two or more cuts or recesses are made in the same wall, they must not be nearer than ten feet to each other.

When party-walls must not be cut.

But party-walls must not be cut for any of the foregoing purposes, if the incisions are likely to injure, displace, or endanger the timbers, chimnies, flues, or internal finishings of the adjoining buildings, and all such cuts must be made good as expeditiously as possible.

Side walls.

Where an independent side wall is intended to be built against a party-wall, the footing of the latter may be cut away to make room for it.

Party-arches over gateways.

Buildings that run over gateways or public passages, or having different rooms and floors, the property of distinct owners, when re-built, must have a party-wall, and a party-arch or arches, at least $1\frac{1}{2}$ brick thick, for the first and second-rate buildings, and one brick thick for second and third rates, between the several rooms and floors, so belonging to different proprietors. But the buildings in the inns of court are exempt from these regulations, it being sufficient that they have party-walls where any rooms or chambers communicate with the staircases, which walls are subject to the same regulations as other party-walls.

Inns of Courts exempt.

Chimnies.

Chimnies must not be erected on timber, except the foundations are required to be planked and piled.

Chimnies back to back.

In party-walls, chimnies may be built back to back; but they must not be less in thickness from the centre of such walls than as follows: for the first-rate, or adjoining to a first-rate, one-brick thick in the cellar, and half a brick in all the upper stories; for the second, third, and fourth rates, or adjoining thereto, three-fourths of a brick in the cellar, and half a brick in all the upper stories.

Chimnies in party-walls not back to back.

Chimnies in party-walls that do not stand back to back, must, in any of the four rates, be built as follows: from the external face of the party-wall, to the inward face of the back of the chimney, in the cellar story, $1\frac{1}{2}$-brick thick; in the upper stories 1-brick from the hearth, to 12 inches above the mantle.

Backs of chimnies not in party-walls.

The backs of chimnies, which are not in party-walls, must be, for the first-rate, not less than $1\frac{1}{2}$ brick in the cellar story, and 1 brick in every other story, from the hearth, to 12 inches above the mantle; for the second, third, and fourth, at least 1 brick thick in every story from the hearth, as before, or 12 inches above the mantle. In each of the rates the backs may be half a brick thinner if the chimnies are built against other walls. *(Vide the Plate.)*

Chimney-breasts.

Chimney-breasts in party-walls must not in any case be less than 1 brick thick in the cellar, and half a brick in every other story.

Withs between flues must not be less than half a brick thick.

Flues in party-walls.

Flues in party-walls may be built against each other, but must not approach nearer than 2 inches to the centres of the walls.

Backs of flues.

The backs of flues and chimnies in party-walls against vacant ground must be lime-whited, or marked in some durable manner.

Timber in chimnies.

Timbers must not be inserted at the openings of any chimnies for supporting the breasts, but each of the openings must be provided with one, two, or more strong wrought-iron bars for the purpose, subsequently to the openings being arched over with brick or stone.

Hearths to chimnies.

Chimnies must be fitted with slabs or foot paces, of stone, marble, tile, or iron, at least 18 inches broad and 12 inches longer than the openings of the chimnies, when finished; and the slabs must be laid on brick-work or stone-trimmers, at

least 18 inches broad, from the face of the chimney-breast, except where there is not any vacuity beneath, in which case they may be bedded on the ground.

Brick-funnels. Brick-funnels must not be made on the outside of any building of the first, second, third, or fourth, rate, next to any street, square, or road, &c., so as to project beyond the general line of buildings.

Metal funnels. Funnels, or pipes of iron, copper, tin, &c., for the conveyance of smoke or steam, must not be fixed near any public street, court, way, &c. to houses of the first, second, third, and fourth, rates; nor must such pipes be fixed within the building nearer than 14 inches to any timber or combustible material.

Chimney-jambs. Chimney-jambs and breasts, &c. must be built in party-walls, where desired, by the owner of the adjoining ground.

Owners of premises may be compelled to join in building party-walls.

Owners under disabilities. And where owners are under disabilities, or houses are uninhabited, the most summary means may be taken, under this Act, to make all the parties unite in the joint expense.

Juries to determine. Juries to determine what proportion of the expense shall be paid by the owners of the adjoining premises.

Courts to give judgment. Courts to give judgement according to the verdict in such cases, and their judgement to be binding and conclusive.

Such verdict to be recorded by the Town-clerk, or the Clerk of the Peace.

To be recorded within fourteen days. Within fourteen days after judgement, and payment or tender of money awarded, the owners of the intermixed property may pull it down; and may also enter the adjoining buildings in the presence of a peace-officer, and may remove goods and furniture.

Hindrance to workmen. And persons hindering the workmen, or damaging the work, to forfeit £10. to be levied, recovered, and applied, as hereafter mentioned.

Part of expenses repaid. Builders to be repaid part of the expenses, according to the verdict given, within twenty-one days after the demand.

Lord-Mayor's courts. Court of the Lord Mayor and Aldermen may be held in the outer chamber of Guildhall in matters relating to this Act.

County of Surrey. Sessions for the County of Surrey to be holden in Southwark, and all adjournments touching any subject matter of complaint, to be settled within three weeks, or adjourned from time to time.

Sheriffs and witnesses. Court may fine the Sheriffs, or Under-Sheriffs, making default, and also any witnesses making default in attendance.

Party-arches. Old party-walls and party-arches, when decayed, must be re-built.

The owners pulling down such party-walls or party-arches, must give three months' notice. The annexed is the prelude to the form of such notice.

Notice to pull down party-walls. Apprehending the party-wall, party-arch, or party-fence wall, or some part thereof, (as the case shall be) between the house, or building, or ground (as the case shall be) thereto adjoining, situate   inhabited or occupied by   and my house or building or ground) as the case shall be) adjoining thereto, to be so far out of repair as to render it necessary to repair, or pull down, and rebuild the same, or some part thereof. Now take notice, that I intend to have the said party-wall, party-arch, or party-fence wall (as the case shall be) surveyed, pursuant to an Act of Parliament made in 14th year of the reign of King George the Third; and that I have appointed   of   and   of   my surveyors, to meet at   in   being at some place within the limits aforesaid, on my behalf, on the   day of   next at   of the clock in the   of the same day (being between the hours of 6 in the morning and 6 in the afternoon.) And I do hereby require and call upon you to appoint two other surveyors, or able workmen, on your part, to meet them at the time and place aforesaid, to view the said party-wall, party-arch, or party-fence wall, (as the case shall be) and to certify the state and condition thereof, and whether the same, or any part thereof, ought to be repaired, or pulled down and rebuilt. Dated this   day

Subsequent to the preceding notice being served, surveyors must be appointed by the opposite party to view the *party-walls* and *party-arches.* **Two surveyors on each side.**

If the major part of the surveyors do not certify within one month, other surveyors to be appointed by a justice within the district.

Walls being certified by the surveyors to be ruinous, a copy of the certificate to be delivered to the owners, &c. in three days. **Walls certified to be ruinous.**

Owners thinking themselves aggrieved may appeal to the general quarter sessions, whose determination shall be final. **Owners may appeal.**

The powers of the parties intending to repair, &c., in default of appeal, may be carried into effect within 14 days after delivering the copy of the surveyor's certificate. **Power to proceed in case of default of appeal.**

The owners of houses of the first, second, and third rate, must give three months' notice, in writing, before pulling down *party-walls.* **Three months' notice**

The owners of houses having partitions of wood, must give three months' notice to owners of adjoining houses of their design to pull down the same; and afterwards they may pull down the said partitions, remove furniture, &c.

Owners of adjoining premises are to contribute in proportions to the ratios of the rates of buildings where partitions and *party-walls* are taken down. **Owners, how reimbursed.**

Until the proportionate expenses are adjusted and paid in building, the property in *party-walls* is vested in the builder, and subsequent to payment they become joint property. **Until paid the property of the builder.**

The expense of building *party-walls* or *party-arches,* is directed to be made after the rate £7. 15*s.* per rod for new brick-work, deducting £1. 8*s.* per rod for the old materials (if any) or of so much of the walls or arches as did belong to the walls taken down, and *two-pence* per foot cube for old timber. **£7. 15*s.* per rod for brick-work, &c.**

The value of brick-work having doubled since the Act passed, the current price between party and party is allowed and sanctioned by all the most respectable valuators and surveyors.

Ten days after *party-walls* are finished, an account to be left with the owner of the adjoining buildings, what he is liable to pay; and in case the same is not paid within twenty-one days next after demand, then the same may be recovered with costs of suit. **Ten days after wall is built, bill to be delivered, &c.**

If three months' notice has been given to pull down, double costs may be recovered in the event of non-payment. **Double costs.**

Party-walls must be such as are required for the highest rate of building adjoining, and not to be of less thickness, and may be raised by the owner of one side. **Party-walls according to the highest adjoining.**

If the owner of the other side makes use of it, he must contribute to the expense.

Party fence walls may be raised by the owner of one side, but must not be used as a *party-wall,* unless of sufficient thickness. **Party-fence walls.**

Owners of one side may take down a party-fence wall, and build a party-wall.

If the owner of the other side uses it other than as a party-fence wall, he must contribute to the expense.

The first builder not to lose any right of soil on account of party-wall not being half on each ground. **Builder not to lose his right of soil.**

If the fore and back fronts are taken down within five years, this will be deemed a rebuilding.

No timber to be introduced in or about the brick-work of ovens, coppers, &c., nor within two feet. **Timber about ovens, &c.**

Nor shall any timber be laid in any brick-work nearer than nine inches to the opening of any chimney, or than five inches to any flue, or nearer than five feet above the mouth.

Wood-work in the front of chimnies to be fixed by iron nails or holdfasts. **Wood-work in chimnies, &c.**

Sash and door-frames to be set in reveals at least four inches from the fronts of buildings.

Corner story-posts to streets must be of oak or stone, and twelve inches square. **Corner story-posts.**

Coverings. Flats and roofs, &c. must be covered with tiles, slate, lead, copper, tin, glass, or artificial stone.

External ornaments and covered ways. External ornaments to fronts, of first, second, third, and fourth rates, to be of brick, stone, burnt clay, artificial stone, stucco, lead, or iron, except the cornices and dressings to shop windows; except, also, covered ways which shall not extend beyond the original lines of such covered ways, which must be covered with stone, lead, copper, slate, tile, or tin. Porticos, &c. must not be higher than the one pair of stories.

Water not to drip in streets. Water must not drip next to any public street, square, place, court, or way, from the roofs of *first*, *second*, *third*, or *fourth* rates.

Water must be conveyed by lead, copper, tin, or iron pipes, or by wooden trunks, or by brick and stone funnels to the drains, or channel-stones below the surface of the ground.

Bow-windows not to project. Bow windows must not be built to extend beyond the lines of streets, nor are any projections, allowed beyond them, except for copings, cornices, facias, door and window-dressings, open porticos, steps, or iron palisados.

Shop-windows and stall-boards. Shop-windows in streets, thirty feet wide, must not project more than ten inches, and less than thirty feet, five inches, from the upright lines of the buildings; nor must cornices in streets, thirty feet wide, project more than eighteen inches, and less than thirty feet, more than thirteen inches from the upright lines of the buildings.

Materials of bow-windows. Bow-windows or other projections, except as before described, must be built of the same sort of materials as directed for external walls and inclosures.

Commissioners of paving. And it is enacted, that nothing in the act shall prejudice, lessen, or defeat, the powers granted to the commissioners of paving.

Old external walls or enclosures may be repaired with the same materials.

Not to rebuild bow windows. No bow-window or projection to be rebuilt, unless originally built, or within the line of the street.

Warehouses. Stacks of warehouses must not comprise more than thirty-five squares, including the external and internal walls; nor must any timber be laid in the brick-work of walls in warehouses, nearer than eighteen inches to the openings before described.

Stabling, not more than 25 squares. And stacks or ranges of stabling must not contain more than twenty-five squares, the walls of which are subject to the same provisos as warehouse-walls, and may be opened in like manner to communicate from stable to stable.

Buildings divided into distinct tenures on the ground floor to be deemed separate buildings.

Warehouses and stabling may be divided. Warehouses may be divided and subdivided, for the conveniency of letting the same to under-tenants; and likewise stable-buildings, which are subject to provisos in like degrees of similitude.

Buildings of the fifth and sixth rates, in distinct tenures, and not at the required distances, to be deemed nuisances, and must be taken down.

Buildings erected contrary to Act. Buildings of every description, not erected according to the Act, to be declared common nuisances, and the builders or owners must enter into recognizances to demolish the same, provided convictions are recorded within three months after such buildings shall have been finished.

Power of the magistrates to cause buildings to be taken down. Buildings deemed nuisances to be ratified by the Lord Mayor, or any two or more magistrates in the county of Middlesex or Surrey, or city and liberty of Westminster, or liberty of His Majesty's Tower of London, who may direct such buildings to be pulled down, and may authorise and cause the materials to be sold to defray the expenses, which, if insufficient, must be made good by the owner, but if any surplus arising out of the sale, the same must be paid over.

Mayor to elect surveyors. The Lord Mayor and Aldermen of the City of London to elect district-surveyors during their pleasure throughout the city and its liberties.

The justices of Middlesex and Surrey, &c. to appoint surveyors. The Justices of the Peace for the counties of Middlesex and Surrey, the city and liberty of Westminster, and the liberty of His Majesty's *Tower* of *London*, at their General Quarter Sessions, by the Act are empowered to elect district sur-

veyors in their respective jurisdictions, and to administer to such Surveyors the the following oath.

I, A. B. being one of the surveyors or supervisors appointed in pursuance of an Act of Parliament passed in the fourteenth year of the reign of King George the Third, for the further and better regulation of Buildings and Party-walls, and for the more effectually preventing mischiefs by fire within the cities of London and Westminster, and the liberties thereof, and other the parishes, precincts, and places within the weekly Bills of Mortality, the parishes of St. Mary-la-bonne, Paddington, Saint Pancras, and Saint Luke, Chelsea, in the County of Middlesex; and for indemnifying, under certain conditions, builders and other persons, against the penalties to which they are or may be liable, for erecting buildings within the limits aforesaid, contrary to law, do swear, that upon receiving notice of any building or wall to be built, or other builder's works to be done within the district under my inspection, not being by illness or otherwise lawfully prevented, I will diligently and faithfully survey the same, and to the utmost of my abilities, endeavour to cause the rules and regulations in the said Act prescribed, to be strictly observed; and that without favor or affection, prejudice or malice. Form of surveyor's oath, 14th Geo. III. Penalties to which builders are liable.

So help me God.

District-surveyors, subsequent to their election, to leave notices of their abode with the Clerks of the Peace for the counties of Middlesex and Surrey, &c. Residences of surveyors.

Before any building, or any wall, on new or old foundations, or on foundations partly new and partly old, within the limits of the Act, shall be begun to be built, the master-workman or other person causing such building or wall to be built, shall give twenty-four hours' notice to the surveyor within whose district the same shall be; and such surveyor shall view the said buildings or walls, and see that all the rules and regulations in the Act are well and truly observed. And such surveyor or surveyors, for his or their trouble, shall be paid by such master-workman, or other person, causing such walls to be built, in the following *ratios*, That is, Notice of building to be given to surveyors, with their rates, &c.

	£.	s.	d.	
For every first-rate building	3	10	0	First rate.
For every alteration or addition to do.	1	15	0	
For every second-rate	3	3	0	Second rate.
For every alteration or addition to do.	1	10	0	
For every third-rate	2	10	0	Third rate.
For every alteration or addition to do.	1	5	0	
For every fourth-rate	2	2	0	Fourth rate
For every alteration or addition to do.	1	1	0	
For every fifth-rate	1	10	0	Fifth rate.
For every alteration or addition to do.	0	15	0	
For every sixth-rate	1	1	0	Sixth rate.
For every alteration or addition to do.	0	10	6	
For every seventh-rate	0	10	6	Seventh rate.
For every alteration or addition to do.	0	5	0	

And in case of any prevarication or dispute about the payment of such fees, any two or more of His Majesty's justices of the peace for the city, county, or liberty, in which such building or wall is situate, shall, by any writing under their hands, order and appoint the same to be paid, and in default of payment, the same may be recovered by distress and sale of goods and chattels of such master-workman, or other persons, together with all reasonable costs and charges. Fees, if not paid, summary means may be taken.

District-surveyors are liable to be discharged upon complaints of wilful neglect, or of conducting themselves unfaithfully; and the same being made evident to the Lord Mayor and Court of Aldermen, or to the Justices at the Quarter Sessions by whom the surveyors are appointed, it is in the power of the former Surveyors liable to be discharged for misconduct.

to discharge the latter; and in such cases they are to be deemed, ever after, incapable of being subsequently appointed as surveyors under the Act.

Builders liable to penalties for not giving 24 hours notice.

Master-builders, &c. in default of giving twenty-four hours' notice, to pay treble fees to the surveyor, and to forfeit £10.; and in default of payment, £20. may be recovered, and all the works demolished, if executed improperly, or else amended by an order from the Mayor or two Justices.

Surveyors to give information.

The surveyors to give informations of irregular buildings within their several districts, either to the Lord Mayor and Court of Aldermen, or to the respective magistrates without the precincts of the city.

Penalty on workmen.

Workmen, or servants to any master-workman, or other persons concerned in building, within the limits of the Act, wilfully, carelessly, or negligently executing any work, contrary to the directions of their employers, or to this Act, on conviction, to be fined fifty shillings, or to be committed to the house of correction, without bail or mainprize, for any time not exceeding three months, nor less than one, unless the penalties are sooner paid.

Houses &c. must be surveyed in 14 days after covered in

New houses or walls, &c. which are built, must be surveyed within fourteen days after covered in, and oath made of the conformity to the Act; which oath must be filed with the Clerk of the Peace for the county, city, or liberty; and the builder neglecting to cause such oath to be made, shall forfeit £10., and the oath must be made within one month after the conviction, on pain of the further penalty of £10., and for every subsequent month the like sum, until such affidavit shall be filed, and each of the penalties may be recovered in the most summary manner, one half of which must be paid to the overseers of the poor for their benefit, and the residue to the person or persons suing to recover the same.

The Act does not extend to any of the king's palaces.

The Act does not extend to any of His Majesty's palaces, or to any house or building being in possession of His Majesty, or employed for his use or services.

When buildings are presented as ruinous, boards must be put up for the safety of passengers.

Owners neglecting to take down, &c.

And if the owners neglect to take down ruinous houses after notice, the Mayor and Aldermen, or overseers of the poor, may order the same to be taken down, or secured; and they may sell the materials, and satisfy themselves out of the sales.

The overplus of sales.

The overplus (if any) arising from such sales, to be paid to the owners any time within six years, on demand.

But if the sale of the old materials should prove to be insufficient, the owners or occupiers must make good the deficiencies; and subsequently the landlords, as the cases may be, shall allow the deficiencies to their tenants.

To be paid to the chamberlain of London.

In the city of London the monies raised by the sales before described, must be paid into the chamberlain's hands, and from time to time placed to the credit of the cash of the city of London.

Without the precincts of the city, the monies so raised must be paid into the hands of the churchwardens and overseers, to be accounted for at the general audit.

Penalty of £100. for distilling more than ten gallons of turpentine.

Not more than ten gallons of turpentine shall be distilled at any one time in houses contiguous to others, under the penalty of £100. to be recovered with treble costs, one half of which shall be paid to the overseers of the poor for their use, and the remainder to the person or persons who shall sue.

Shipwrights exempted from the preceding clause.

The foregoing clause is not applicable to shipwrights, barge and boat-builders, mast-makers, or other persons employed in building or repairing ships, barges, boats, or other vessels, near the *River Thames*, from boiling or mixing oil or other materials, for the purposes of painting ships, barges, boats, masts, &c.

Fire engines, &c.

Fire engines and ladders must be kept in known places in every parish.

Fire-cocks must be fixed on the mains, and marks near the places where fire-cocks lie, at which houses instruments or keys are to be kept, in cases of fire.

Engines and ladders to be kept in repair by every parish.

Penalty of £10. may be recovered of the church-wardens for default, and which may be levied by distress. £10. penalty on church-wardens.

Ten shillings to be paid by the church-wardens or overseers to the turncock whose water first comes into a main or pipe at a fire.

To the engine-keeper thirty shillings, whose engine first arrives at the fire, in good order. Engine-keepers' fee.

To the second engine-keeper twenty shillings; and to the third ten shillings, each to be in good order.

But no reward to be paid without the approbation of an alderman or magistrate.

Rewards which have been paid by church-wardens for chimney-fires, to be reimbursed by lodgers and inmates, where it can be proved that the same has occurred by the chimnies not being regularly swept, &c. Lodgers, &c. re-imburse.

The mayor and justices are empowered to enforce such reimbursements.

United parishes are to be deemed as one parish only.

Large parishes may have more than one engine, the expenses of which must be defrayed out of the poor-rates, together with rewards to turncocks, engine-keepers, &c. &c. More engines than one in large parishes.

Watermen retained by the insurance offices must not be impressed.

Monies insured on houses burnt, may be laid out at the discretion of the Governors of Insurance Companies in rebuilding, unless securities are given within sixty-one days, that the insurances claimed will be laid out in rebuilding.

Servants by carelessness firing houses, or other buildings, to forfeit £100., or to be imprisoned eighteen months. Carlessness of servants.

Constables and beadles, on notices being given, immediately to repair to buildings on fire. Constables and beadles.

No actions to lie against a person where fires accidently begin.

Distresses not to be deemed unlawful for want of form, nor are the party or parties to be considered trespassers, on account of any defect of routine in the proceedings. Distresses for want of form, not unlawful.

Persons cannot recover if tenders of sufficient amends have been previously made.

No order of the mayor or justices, or other proceedings, to be removed by *certiorari* or any other writ or process whatsoever, into any of His Majesty's courts of record at *Westminster*. Orders of justices cannot be removed.

When persons feel themselves aggrieved by any conviction, commitment, distress, order, or judgment, of the mayor of the city of London for the time being, or of any justice or justices of the peace, made out of sessions, he, she, or they, may appeal to the justices at the general quarter-sessions. If parties feel aggrieved, may appeal.

Provided such persons intending to appeal, shall, within two days after conviction, enter into recognizances to hold him or themselves responsible for all costs that may be incurred, provided his or their applications to the magistrates in sessions should prove ineffectual. Provided appellants give securities for costs.

Parishioners may be witnesses, and shall be deemed competent to give evidence upon any trial concerning any offence committed against the Act. Parishioners may be witnesses.

No action shall be commenced against any person or persons for any penalties incurred by this Act, unless the same shall have been commenced within six calendar months after the offence committed.

Nor shall any actions be commenced against any person or persons for any thing done in pursuance of this Act, until twenty-one days after notice in writing, nor after the expiration of three calendar months subsequent to the fact committed: and if sufficient satisfaction is tendered previous to the action being commenced, the jury or juries to find for the defendant or defendants, with treble costs of suit, which may be recovered in like manner as in all such cases. Limitations of actions, &c.

The foregoing contains the substance of the present Act, which concludes with repealing all former Acts; and enacting, that the present one shall be judicially taken notice of as such by all judges, justices, and other persons whomsoever, without pleading the same. Concluding observations on the building Act.

DUTIES ON WINDOWS.

In the Fourth Year of His present Majesty George IV. the subsequent Duties were levied on Windows, and payable from and after the Fifth of April, 1823.

Rules for regulating the Duties on Windows.

The duties must be charged annually, as regards the windows of every dwelling house, with all the offices appertaining.

Stairs, garrets, &c. Sky-lights, as well as windows in stair-cases, garrets, cellars, and passages, &c. of dwelling-houses, to whatever use applied, whether in the *interior* or *exterior*, are chargeable with the following duties:

Contiguous or detached buildings. Windows, or lights to kitchens, cellars, sculleries, butteries, pantries, larders, wash-houses, laundries, bake-houses, brew-houses, and lodging-rooms, appertaining to any dwelling-house, whether the same be within, or contiguous, or separated from the main body of such dwelling, must be charged with the said duties.

5th April in every year. The duties must be charged yearly upon the occupier, for one entire year, from the 5th of April, and must be levied upon such occupier or his, her, or their executors, except as subsequently provided.

How parties are to proceed in the event of changes. When changes in the occupatious shall take place after the assessments, then the duties charged on the occupiers must be paid by the occupiers, landlords, or owners for the time being, or levied on each and all of them, according to the proportionate times of possession, without any new assessments, not regarding the changes in occupations. But where tenants shall quit on the termination of their leases, and shall have previously given notices to the assessors, the duties shall be discharged for the remainder of the year, provided it shall appear to the commissioners at the end of such year, that such house or houses shall have continued ENTIRELY unoccupied for the remainder of that year.

When occupied by divers persons. Where dwelling-houses are let in separate apartments, and shall from time to time be occupied by two or more persons, the same must be charged as if such houses were occupied by *one* only; and the landlords must be deemed to be the occupiers, and charged accordingly. But where the landlords shall not happen to reside within the districts of collectors, and the window duties shall remain unpaid by *such* landlords for twenty-one days after due, they must be levied on the occupiers, and such payments in advance must be allowed by the landlords out of the next rents.

Safe keeping of houses. Houses which are left to the safe keeping of servants, or other persons, are fully subject to the same duties as if they were entirely occupied by the owners or tenants; and if such persons do not pay rates to the church and poor, the said duties must be paid by the owners or tenants.

Inns of Court, Cambridge and Oxford. Distinct chambers in the inns of court, or of chancery, or in any college or hall, in either of the universities of Cambridge or Oxford, or in any public hospital, are subject to the same duties as entire houses, which duties must be paid by the occupiers; but such chambers which shall not contain more than *seven* windows, shall be charged at the rate of three shillings each.

Public Companies, &c. Dwelling-rooms in halls or offices of any description belonging to persons, or bodies politic or corporate, or to companies charged with the payments of other taxes or parish rates, are subject to the duties, and such places must be charged as dwelling-houses; and those to whom the duties shall appertain, must be charged as the occupiers.

When partitions or divisions between two or more windows or lights, fixed in one frame, are or shall be of the breadths or spaces of twelve inches, the windows or lights on each side of such partitions or divisions, shall be charged as distinct windows. Twelve inches between windows.

Windows extending so far as to give light into more rooms, landings, or stories than one, must be charged as so many separate windows, and equal in number to the rooms, landings, or stories, which are thereby so lighted. More than one.

Windows, including the frames, partitions, and divisions, which, by admeasurement of the entire spaces of the apertures in the walls of houses or buildings on the outsides of such windows, shall exceed in height 12 feet, or in breadth 4 feet 9 inches, and not being less than 3 feet 6 inches in height, shall be estimated and charged as two windows, except such as shall have been made of greater dimensions prior to the 5th of April, 1785; and except, also, the windows in shops, workshops, and warehouses; and except, also, the windows in public rooms, licensed to sell wine, ale, or other liquors, by retail, for the entertainment of guests; and except, likewise, the windows in farm-houses. Size of windows.

Dwelling-houses which may be divided into different tenements, being separate properties, are subject to the same duties as entire houses, and the duties must be paid by the respective occupiers; but every tenement throughout England and Wales, to the town of Berwick-upon-Tweed, which does not contain more than seven windows, shall be rated at 3*s.* per window, and in Scotland at 2*s.* per window. Dwelling-houses, divided into tenements.

The palaces, houses, or other buildings appertaining to His Majesty, or to any of the Royal Family, and likewise all the public-offices, for which the duties heretofore have been paid by His Majesty, or out of the public revenue, are *exempt* from the duties last imposed. Royal palaces and public offices exempt.

Hospitals, charity-schools, or houses provided for poor persons, or rooms licensed as chapels, must be brought into account by the assessors or surveyors, and must be stated in the certificates of assessments as such; and upon satisfactory proofs of the facts before the commissioners by the assessors, the commissioners are bound to discharge such hospitals, charity-schools, houses for poor persons, and rooms licensed as chapels, from the subsequent duties.

The apartments in hospitals, charity-schools, or houses provided for poor persons, which are occupied by the officers or servants of such establishments, must be assessed proportionately to entire dwelling-houses; but windows of rooms licensed for the purposes of Divine worship, and not used for any other purpose, are exempt. Hospitals, chapels, &c.

The windows in dairies or cheese-rooms appertaining to, and occupied with, dwelling-houses, when used by the occupiers for the purposes of keeping butter and cheese, their own produce, either for sale or private use, are *exempt* from the duties, provided the apertures of the windows are composed of splines, wooden laths, or iron bars, and entirely without glass, and that the occupiers shall paint on the outer door, in large roman characters, the words *Dairy* or *Cheese-room;* and provided also that such dairies, or cheese-rooms, shall not at any time be used to dwell or sleep in, but shall be kept entirely for the purposes beforementioned; and provided, also, that assessments of all such windows shall be duly made, and the facts reported to the commissioners, in the manner directed in similar cases of exemption before described. Dairies or cheese-rooms.

It is apprehended that the duties on Windows are amongst those which His Majesty's Ministers have in contemplation to repeal, which event we sincerely hope will soon take place, for the sake of our friends in the Building Profession, as well as our fellow-subjects in general.

List of Duties on Windows.

Number of Windows that the Occupiers and Owners of Houses are to be charged with.	Duties to be charged on Windows.		
	£.	s.	d.
No. 6, Window duty is	0	4	0
If houses, with their offices and gardens, are not worth the yearly rent of £5., and not exceeding 6 windows ..	0	3	3
7 windows	0	10	0
8 do	0	16	6
9 do	1	1	0
10 do	1	8	0
11 do	1	16	3
12 do	2	4	9
13 do	2	13	3
14 do	3	1	9
15 do	3	10	0
16 do	3	18	6
17 do	4	7	0
18 do	4	16	3
19 do	5	3	9
20 do	5	12	3
21 do	6	0	6
22 do	6	9	0
23 do	6	17	6
24 do	7	5	9
25 do	7	14	3
26 do	8	2	9
27 do	8	11	0
28 do	8	19	6
29 do	9	8	0
30 do	9	16	3
31 do	10	4	9
Number of Windows that the Occupiers and Owners of Houses are to be charged with.	**£.**	**s.**	**d.**
32 Windows	10	13	3
33 do	11	1	6
34 do	11	10	0
35 do	11	18	3
36 do	12	6	9
37 do	12	15	0
38 do	13	3	6
39 do	13	12	0
40 to 44, do	14	8	9
45 to 49, do	15	16	9
50 to 54, do	17	5	0
55 to 59, do	18	13	0
60 to 64, do	19	17	9
65 to 69, do	21	0	3
70 to 74, do	22	2	6
75 to 79, do	23	5	0
80 to 84, do	24	7	6
85 to 89, do	25	10	0
90 to 94, do	26	12	3
95 to 99, do	27	14	9
100 to 109, do	29	8	6
110 to 119, do	31	13	3
120 to 129, do	33	18	3
130 to 139, do	36	3	0
140 to 149, do	38	8	0
150 to 159, do	40	12	9
160 to 169, do	42	17	9
170 to 179, do	45	2	6
180 do. and upwards	46	11	3

And all such dwelling-houses which shall contain more than 180 windows, or lights, for every window or light, exceeding 180 in number, each window or light must be charged after the rate of 1*s.* 6*d.* per window.

Duties on Houses occupied.—For every house inhabited, which shall be worth, with the offices, gardens, &c. attached thereto, £5. per annum, and under £20, the yearly rent of 1*s.* 6*d.* in the pound; from £20 to £40., 2*s.* 3*d.* in the pound; from £40. and upwards, 2*s.* 10*d.* in the pound. *This duty it is also sincerely desired will be repealed.*

THE LONDON PAVING-ACT.

THIS ACT, *for better Paving, Improving, and Regulating the Streets of the Metropolis; and also for removing and preventing Nuisances and Obstructions therein, was passed into a Law on the* 16*th of June,* 1817, *in the Fifty-seventh Year of the Reign of our late King, George the Third.*

It is commonly called Mr. MICHAEL ANGELO TAYLOR'S ACT, from the circumstance of that honourable gentleman having taken a very active part in causing it to be brought into Parliament, and diligently superintending its progress, as a member of the House of Commons, until it was ultimately sanctioned and approved on the day and year above-named. Passing of the Act.

It contains many wise and salutary regulations, which are essential to be known to the inhabitants of this great town, but more especially to those who are concerned in the building profession; and, as a Local Act, is recommended to the perusal of all who are, in any respect, interested in whatever concerns the improvement of the Cities of London, Westminster, and environs. Recommended to builders.

It was our intention to have given a copious Abstract of the present Act; but the extent of our Work will not permit us to give any more than the following clause, which is absolutely necessary to be known by every practical builder, who exercises the art of building within the precincts before described.

By the fifty-third clause of the said Act, it is enacted, That no person or persons shall take or break up, or cause to be taken or broken up, any pavement in any street or public place, in any parochial or other district within the jurisdiction of this Act, or make any alteration therein, under any pretence whatsoever, without the consent of the commissioners or trustees, or other persons having the controul of pavements, or their surveyor or surveyors for the time being, first obtained and certified under the hand or hands of their clerk or clerks, or their surveyor or surveyors for the time being; and that all persons to whom such consent shall be granted, shall be subject and liable to all the provisions in the Act contained, in respect to the Water and Gas-Light Companies and the Commissioners of Sewers, as to the reparation of the pavements, and as to the removal of all rubbish and other obstructions; and as to the provision of bars, watchmen, and other securities, and to all penalties by this Act imposed on the breach of any such provisions respectively, and to such other conditions and regulations as the said Commissioners or Trustees, or other persons consenting, as aforesaid, shall stipulate and direct, and shall obey and perform the same; and that in case any person or persons, (except Water and Gas-Light Companies, and the Commissioners of Sewers, and who are to conform to the particular provisions of this Act relating to them,) shall take or break up, or cause to be taken or broken up, or shall wilfully damage any pavement in any street or public place, or shall make or cause to be made any alteration therein, without such consent, as aforesaid, then any and every such person or persons, in every such case so offending, shall, for each and for every such offence, forfeit and pay a sum not less than *Five Pounds*, nor exceeding *Ten Pounds*: and also, for each and every square foot of pavement, exceeding one foot, so taken or broken up or altered, or so wilfully damaged, shall forfeit and pay any sum, not being less than *Five Pounds*, nor exceeding *Ten Pounds*, which may be recovered in the same manner in which other penalties and forfeitures are directed to be recovered, by virtue of the said Act. Pavement not to be broke up without leave of surveyor. Five pound penalty for offending.

Builders recommended to consult surveyors.

It being, therefore, important to builders and others not to violate any of the clauses in the Paving-Act, perhaps they cannot proceed more discreetly than to consult the paving-surveyor before any alterations in the pavements are presumed to be made; and as the names of such surveyors are conspicuously painted on boards, posted in every parish where the Act applies, information may be speedily obtained, and *without any expense.*

On Street-Paviors' Works.

Macadamizing streets.

If the proposed plans for Macadamizing the streets of London, and other large towns, could be consistently carried into effect, the business of the *Street Pavior* would presently merge into the speculative views of the parochial or county-road maker; but as long as common-sense prevails, we are satisfied that Macadamizing will not be general in the narrow streets of any great commercial town, where the intercourse of heavy carriages are indispensable to carry on the commerce of the country. In wide streets, upon inclined planes, such as Regent-street, Oxford-road, Holborn, Saint James', and Parliament-street, and in many others, if the center parts were paved with granite for heavy carriages, and the sides Macadamized, no doubt is entertained that the principle would, in the course of time, be generally approved; but in narrow streets, constantly thronged with heavy-laden carriages, roads, such as those made by the *ancients*, and recommended by Mr. M'Adam, never can, we think, answer the purpose. Upon the bridges, and in parts contiguous to places of Divine worship, as well as Courts of Justice, they should be sanctioned and recommended; as also in the squares at the west-end of the town, where tranquillity is most desirable to the inhabitants, many of whom, from their daily vocations, are compelled to spend considerable portions of their time in the noisy streets of the city, amidst the din of carts, horses, and vehicles of every sort.

How to measure.

Street as well as other paviors' works, are measured by the superficial square yard; but the better sort of paving, to foot-ways, consisting of Purbeck and Yorkshire paving, is measured and valued at per foot superficial, and curb stones at per foot running measure.

Average Prices of Street-Paviors' Work in London.

Moor-stone paving.

Moor-stone curbs, according to their thickness, and worth from 2*s.* 6*d.* to 2*s.* 9*d.* and 3*s.* per foot run.

Moor-stone paving, about $3\frac{1}{2}$ inches thick, is worth from 1*s.* 8*d.* to 2*s.* and 2*s.* 4*d.* per foot super.

Yorkshire, Purbeck, &c.

Yorkshire curb-stone is worth from 2*s.* 6*d.* to 2*s.* 9*d.* and 3*s.* per foot run.

3-inch Yorkshire paving, per foot super, 1*s.* 3*d.*

$2\frac{1}{2}$-inch do. 1*s.* per foot super.

Yorkshire Channel stone, per foot run, 1*s.* 6*d.*

Purbeck do. do. 1*s.* 9*d.*

Old paving squared and re-laid, per foot super, 3*d.*

Old curb stones re-set, per foot run, 3*d.*

Holes cut in flag-stones, for coal-plates, according to their sizes, from 1*s.* 6*d.* to 1*s.* 9*d.* and 2*s.* each.

Kentish-rag, &c.

Common Maidstone or Kentish-Rag paving, is worth from 3*s.* 9*d.* to 4*s.* and 4*s.* 3*d.* per yard, gravel included.

New Purbeck squares are worth from 8*s.* 6*d.* to 9*s.* and 10*s.* per yard.

Prices for street-paving.

Common country boulder paving, from 1*s.* 6*d.* to 1*s.* 9*d.*, 2*s.*, 2*s.* 3*d.*, and 2*s.* 6*d.* per yard.
7-inch granite paving, from 8*s.* 6*d.* to 9*s.* and 10*s.* 6*d.* per yard.
9-inch do. from 11*s.* to 12*s.* and 13*s.* per yard.
Common 7-inch pebble-paving, from 5*s.* to 5*s.* 6*d.* and 6*s.* per yard.
Common 9-inch do., from 6*s.* to 6*s.* 6*d.* and 7*s.* per yard.
Common pebble-paving from 18*s.*, to 20*s.*, 22*s.* and 24*s.* per ton.
Common Kentish Rag-stones, from 11*s.* to 12*s.*, 13*s.*, and 14*s.* per ton.
Pavior, per day, from 4*s.* to 4*s.* 6*d.* and 4*s.* 9*d.*
Labourer, do , from 3*s.* to 3*s.* 3*d.*, 3*s.* 6*d.*, and 3*s.* 9*d.*
Gravel, according to its qualities, from 5*s.* 6*d.* up to 6*s.*, 7*s.* 8*s.*, and 9*s.* per load.

MEMORANDA.—*For the value of each sort of brick-paving, as well as Portland and other choice pavements, our friends are referred to the* MASTER-BRICKLAYERS', MASONS', *and* STONE-CUTTERS' PRICES, *&c. &c.*

ARCHITECTS, SURVEYORS, MEASURERS, AND VALUATORS' LICENSES.

Acts of Parliament.

BY the perusal of the 46th and 48th of George the Third, relative to valuators, &c., it is manifest that *Architects, Surveyors,* &c., are as much subject to those acts as the most *Common Appraisers.*

Architects and surveyors are appraisers.

It is true, that professional men are not termed what are usually called *appraisers;* yet, to all intents and purposes, they are valuators, when they undertake to ascertain and fix the prices of artificers' works, &c.; and, under these circumstances, are certainly liable to the penalties imposed by the acts in question, and therefore should annually take out licenses to enable them legally to recover their fees; the cost of which is only six shillings per annum.

Name and place of abode of surveyors, in licence, to be procured at the Stamp-office.

The act unequivocally states, that no person shall exercise the calling or occupation of an appraiser, or act as such, within the intent and meaning of the law, without annually taking out a licence, which must state the true name, and place of abode, of the person taking out the same, and to be dated 6th July, in every year; and persons offending or practising without obtaining such licence, are subject to the penalty of *Fifty Pounds,* which may be recovered in the most summary manner. It is therefore important to professional men to take out their licenses annually, as, without the same, they are constantly subject to the penalty before mentioned; and, what is still worse, rendered incapable of recovering the amount of their professional fees.

48th Geo. III.

The 48th of George the Third, also recites the duties on the *valuation* of estates, effects, real or personal, hereditable or moveable, or of any interests therein, or of the annual value thereof, or of any *dilapidations,* or of any *repairs* wanted, or of the *materials* and *labour* used, or in any *buildings,* or of any *artificers' works* whatsoever, where the amounts of such appraisements or valuations shall not exceed £50., a stamp of 2*s.* 6*d.*

Stamps on valuations.

	£.	s.	d.
From £50. to £100	0	5	0
—— £100. to £200	0	10	0
—— £200. to £500	0	15	0
—— Exceeding £500	1	0	0

Valuations to be delivered within 14 days.

And the same act furthermore states, That every APPRAISER or SURVEYOR shall write, or set down, in letters, words, or figures, every valuation or appraisement made by him, or them, being the full amount; and, within fourteen days

after making the same, that he, or they, shall deliver such valuation or valuations to his or their employers, on pain of forfeiting for each neglect, in not delivering such valuations or appraisements, being the full amount, on paper or parchment, not duly stamped, the sum of *Fifty Pounds*, to be recovered in the same manner as the penalties for not taking out annual licenses.

Persons employing appraisers, rules to be observed.

And the same act also recites, That any person, who shall employ any surveyor or appraiser, to make any such valuations or appraisements, that such persons shall not pay, or make any compensation, for the making of any such valuations or appraisements, unless the same shall be written, or set down, in words or figures, upon paper or parchment duly stamped; nor shall any such surveyor or appraiser receive, or take any compensation, for his or their trouble, unless the stipulations herein mentioned are duly complied with, and the paper, or parchment, duly stamped; the violation of which clause not only subjects the employer, but the employed, to the full penalty of *Twenty Pounds*, which may be recovered in the same manner as the penalties for not regularly taking out annual licenses, in expectation of receiving any *gain*, *fee*, or *reward*, for making VALUATIONS.

20*l.* penalty.

Appraisements or valuations, made in pursuance of any orders from the Court of Admiralty, are exempt.

Nor are auctioneers liable to the above penalties, who regularly take out their licenses.

Professional charges.

Architects' and Building-Surveyors' charges in London, &c., for making plans, elevations, sections, specifications, and estimates, including superintendance, is 5 per cent. upon the ascertained value of the buildings, which per centage is divided into four equal parts: the *first*, for plans and general particulars; the *second*, for detailed estimates and specifications; the *third*, for superintendance; and the *fourth*, for measuring and settling tradesmens' accounts; and when distant from the metropolis, all extra expenses of travelling in addition thereto.

FINIS.

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ALPHABETICAL LIST

OF THE

DISTRICT-SURVEYORS

For the City of London, City and Liberty of Westminster, County of Middlesex, Tower Hamlets, and County of Surrey,

WITH THEIR PLACES OF RESIDENCE.

A.	
ACTON, Mr. Samuel, 30, Wilson Street, Finsbury Square	Glass-house Yard Liberty St. Luke, Old Street
B.	
BAKER, Mr. Henry, 46, Berners Street, Oxford Street	St. Pancras
BEACHCROFT, Mr. Sam., 179, Sloane Street	St. Luke, Chelsea
BEAZLEY, Mr. Charles, Regent Street; his Agent, Mr. NEW, No. 13, John Street, Adelphi	St. James's, Clerkenwell St. John's, Clerkenwell
C.	
CANTWELL, Mr. Joseph, 20, Great Marlborough Street	St. Clement Danes St. Martin-le-Grand St. Mary-le-Strand St. Paul, Covent Garden
COCKERELL, Mr. Samuel Pepys, Old Burlington Street	St. George, Hanover Square
CRAIG, Mr. Charles Alexander, Great George Street, Westminster	St. Mary, Lambeth St. Mary, Newington Butts
D.	
DONALDSON, Mr. James, Bloomsbury Square	St. Andrew, above the Bars St. George the Martyr, Queen Square Liberty of the Rolls
E.	
EDWARDS, Mr. William, Duncan Place, City Road	St. Mary, Islington St. Sepulchre without
G.	
GIBSON, Mr. Jesse, Grove Street, Hackney	Aldgate Ward Billingsgate Ward Langborn Ward Lime Street Ward Portsoken Ward Tower Ward
GOFF, Mr. Major, Well-close Square	Tower Royalty
GUTCH, Mr. George, Bridge House, Harrow Road	Paddington
H.	
HILL, Mr. Charles, Scott's Place, Islington	Christ Church, Spitalfields Mile End, New Town Saint Paul, Shadwell
HUNT, Mr. T. F., Stable-Yard, St. James's Palace	Ely Rents Hatton Garden Liberty St. Mary-le-Strand, within the Duchy of Lancaster Precinct of the Savoy Saffron Hill Liberty
J.	
JEFFERY, Mr. George, Kennington Oval	Christ Church, Southwark St. George, Southwark St. Saviour, Southwark

DISTRICT-SURVEYORS.

JUPP, Mr. William, 37, Old Broad Street Chambers, and at Mr. May's, White-Horse Lane, Stepney	St. Ann, Limehouse St. Ann, Blackwall Precinct of St. Catharine's Hamlet of Ratcliff St. John, Wapping Mile End, Old Town Mile End, Poplar Stepney
K.	
KENDALL, Mr. Henry Edward, Suffolk Street, Pall Mall, East	St. Ann, Soho St. Martin in the Fields
KINNAIRD, Mr. William, 99, Great Russel Street	St. George, Bloomsbury St. Giles in the Fields
L.	
LEREUX, Mr. J. Clapton	Bethnal Green St. John, Hackney
M.	
MASON, Mr. William, Berner Street, Commercial Road	St. Botolph without Aldgate St. George in the East St. Mary Bow, by Stratford
MAYHEW, Mr. Westminster Fire-Office; and 18, Argyle Street, Oxford Street	St. James, Westminster
MEYMOTT, Mr. William Gurr, Southampton Street, Camberwell	St. John, Southwark St. Olave, Southwark St. Thomas, Southwark
MONTAGUE, Mr. James, Office of Works, Guildhall	Bassishaw Ward Bishopsgate Ward within Bishopsgate Ward without Broad Street Ward Coleman Street Ward Cornhill Ward Cripplegate Ward within Cripplegate Ward without
MONTAGUE, Mr. William, Office of Works, Guildhall	Aldersgate Ward within Aldersgate Ward without St. Bartholomew the Great St. Bartholomew the Less Cheap Ward Farringdon Ward without
P.	
PILKINGTON, Mr. William, Scotland Yard	St. John Evangelist, Westminster St. Margaret, Westminster
PORTER, Mr. George, Fort Place, Bermondsey	St. Mary Magdalen, Bermondsey St. Mary, Rotherhithe
S.	
SMITH, Mr. George, 8, Bread Street Hill	Bread Street Ward Precinct of Bridewell Bridge Ward Candlewick Ward Castle-Baynard Ward Cordwainers' Ward Dowgate Ward Farringdon Ward within Queenhithe Ward Vintry Ward Walbrook Ward
W.	
WHARTON, Mr. Matthew, Sen. 20, Spital Square	Liberty of Norton Falgate St. Leonard, Shoreditch
WHARTON, Mr. Matt., Jun. Stepney Causeway	St. Mary, Whitechapel
WHITE, Mr. John, New Road, opposite Devonshire Place	St. Mary-la-bonne

☞ *This leaf to be placed opposite the first page of the "Building Act."*